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ANNUAL REPORT

OF THE

SURGEON GENERAL OF THE
PUBLIC HEALTH SERVICE
OF THE UNITED STATES

FOR THE FISCAL YEAR
1922



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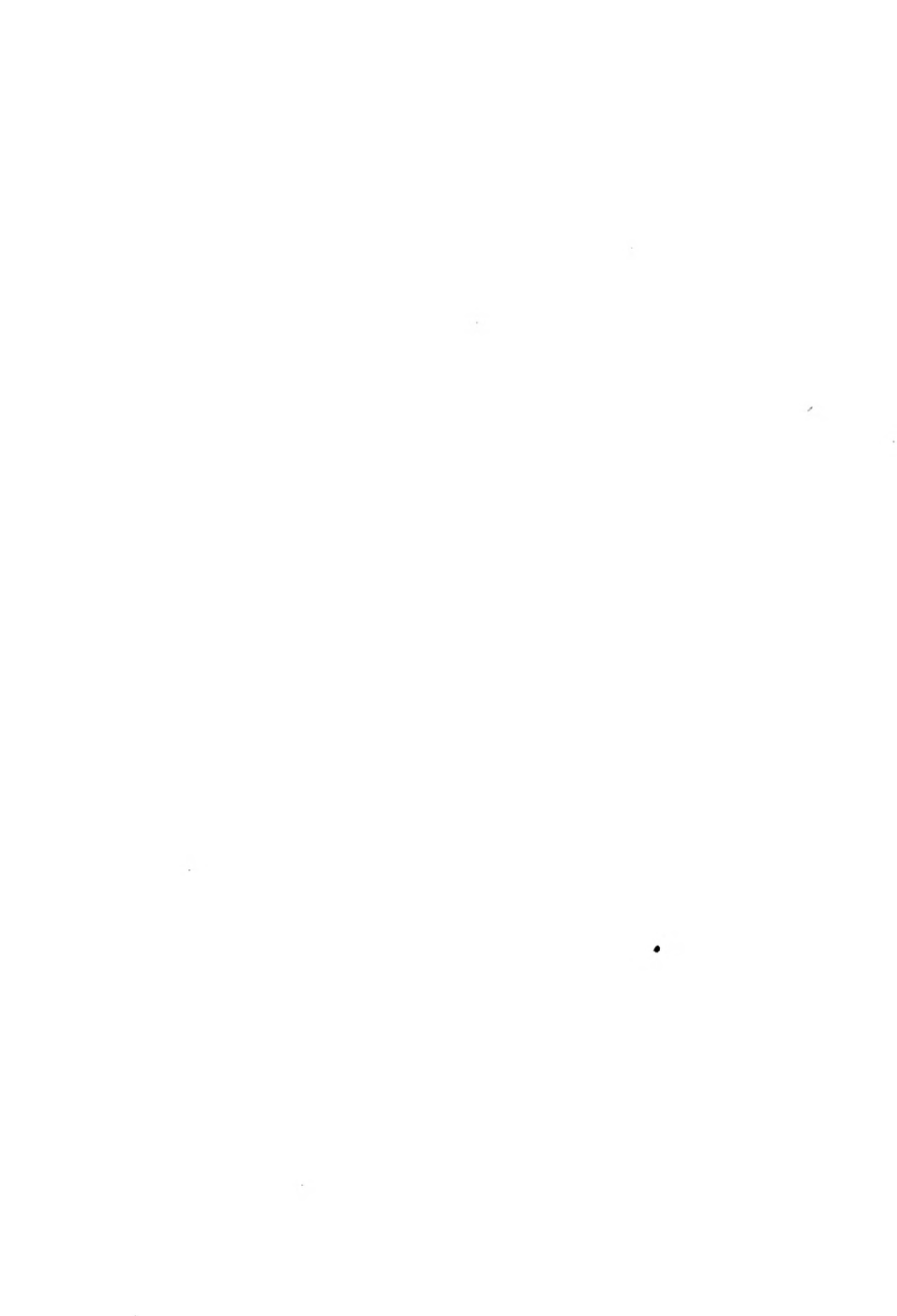
TREASURY DEPARTMENT,
OFFICE OF THE SECRETARY,
Washington, December 4, 1922.

SIR: In accordance with section 9 of the act of Congress approved July 1, 1902, I have the honor to transmit herewith the report of the Surgeon General of the Public Health Service for the fiscal year 1922.

Respectfully,

A. W. MELLON,
Secretary.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.



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ANNUAL REPORT OF THE SURGEON GENERAL OF THE PUBLIC HEALTH SERVICE.

TREASURY DEPARTMENT,
BUREAU OF THE PUBLIC HEALTH SERVICE,
Washington, D. C., October 13, 1922.

SIR: In accordance with the act approved July 1, 1902, I have the honor to submit, for transmission to Congress, the following report of the operations of the United States Public Health Service for the fiscal year ended June 30, 1922. This is the fifty-first annual report of the service, covering the one hundred and twenty-fourth year of its existence.

These operations have related both to measures for the protection of the public health and the rendering of care and treatment to beneficiaries, including veterans of the World War. The year has been eventful from a service standpoint, both because of an increasing resumption of public health work and the relinquishment of certain functions hitherto performed in relation to the care and treatment of ex-service men and women.

With the exception of localized outbreaks, there has been an absence of epidemic diseases through the country during the year. Both the morbidity and mortality rates have been lower than in previous years. Every effort has been made to secure and disseminate promptly information regarding health in the United States; and through medical and consular officers abroad, careful watch has been kept on the occurrence of epidemic diseases throughout the world.

Bubonic plague is perhaps the most widespread of all diseases of a pestilential character in the world, except smallpox. In the early part of the present fiscal year this disease threatened to become epidemic in the southern part of the United States, particularly in cities of the Gulf coast, but prompt and radical measures applied to local conditions in Galveston, Beaumont, and Pensacola, where the disease had gained a foothold, and the continuation of the measures already in force in New Orleans, served to avert its spread.

Yellow fever foci were reported during the year in widely scattered areas on both the eastern and western coasts of Mexico, the eastern coast of Central America, and certain portions of the Atlantic and Pacific coasts of South America. In spite of close and active commercial relations with infected ports, and the occurrence of five cases of this disease on ships arriving at domestic ports situated in infectible territory, the disease was successfully excluded from our country.

Cholera, smallpox, and typhus fever were prevalent in many European countries. As an aftermath of the war, there has been a marked increase in the number of cases of all three diseases, con-

stituting veritable epidemics. Commercial relations have been maintained with the countries suffering from these conditions almost without inconvenience to international commerce.

The importance of the menace of these serious diseases has recently been emphasized by the health committee of the League of Nations, and the Minister of Health of Great Britain, commenting recently on their report, says in part:

These facts, stated boldly in the report by men who, owing to their scientific training, are careful to avoid exaggerated language, deserve consideration. * * *

The need of defending this frontier can not make the dramatic appeal of a war between contending armies. But from the point of view of the health of the western peoples, upon which our future prosperity and contentment depend, it is as imperative that our medical advisers should be given the means to preserve the sanitary cordon as intact as possible, as it was necessary in 1918 to resist the attempt of the Teutonic powers to break through the channel ports. * * *

In order to guard against the introduction of the quarantinable diseases into the United States and its possessions, trained officers of the service have been stationed abroad. As a result of the measures taken by them under the quarantine laws and regulations, the danger of the introduction of quarantinable diseases has been obviated, and the delay to ships engaged in international traffic has been greatly minimized.

All of the maritime quarantine stations at the domestic ports are now operated by the service, and all arriving aliens are likewise examined in accordance with the immigration law. These functions require an extensive organization representing group activities involving large amounts of work. Such work requires the employment of highly skilled professional and scientific personnel, with trained technical workers.

Under recent provisions of law, charges are made for services rendered at domestic quarantine stations. These fees revert to the Treasury. In amount they exceed the sum required for the maintenance of the quarantine service. Reference may be made here to other activities of the Public Health Service which are productive of revenues that revert to the miscellaneous receipts of the Treasury.

With the opening of the leprosy hospital, a beginning has been made toward the segregation of lepers in the United States, both as a humane measure and in the interest of the public health. The importance of this provision can not be overestimated. The experience of other countries has been that it is the only means whereby the disease may be eradicated. If segregation is carried out thoroughly, just as satisfactory results may be accomplished in this country. If this is not done, the disease will spread and constitute an ever increasing public-health problem. The facilities at the leprosy hospital are already overtaxed. Additional beds are urgently needed to meet requirements.

The activities in respect to the medical care and treatment of the veterans of the World War having in large part been transferred to the United States Veterans' Bureau in accordance with the act approved August 9, 1921, the Public Health Service has greatly decreased its facilities, including personnel, formerly engaged in this work. On June 30, 1921, the total personnel of the Public Health Service was 23,078, and on June 30, 1922, it was 9,357. This latter number includes 884 commissioned officers of the Reserve

Corps detailed to the United States Veterans' Bureau, and 4,166 collaborating epidemiologists at the nominal salary of \$1 per annum.

The work of the Public Health Service relating to the care and treatment of ex-service men and women was undertaken as an emergency during 1919. The magnitude of the medical relief activities during the intervening years is evidenced by the fact that within that period there were treated over 275,000, to whom were given more than 14,500,000 relief days. Approximately two million out-patient treatments were given and 1,500,000 physical examinations made. For a considerable period, the Public Health Service carried more than 80 per cent of the total volume of the work connected with the medical care and treatment of these beneficiaries. It is felt these responsibilities were met in a commendable manner. The experiences gained in this work should be valuable to the officers in the resumption of normal service activities. The morale of the service remains at a high state.

Public-health activities have been actively continued throughout the year, and cooperation with other governmental agencies has been rendered as fully as possible.

Among the important duties which have devolved upon the Surgeon General may be mentioned his service with the administrative board of the maternity and child welfare act, with the Federal Board of Hospitalization, and as director of the International Sanitary Bureau. The importance to health and commerce of maintaining cordial relations with the sanitary authorities of the countries of the Western Hemisphere has long been recognized.

Cooperative relations have been maintained with other governmental agencies, including the United States Veterans' Bureau, the Employees' Compensation Commission, the Bureau of Mines, the Bureau of Chemistry, the State Department, the Post Office Department, the National Park Commission, the Army, the Navy, the Coast Guard, the Coast and Geodetic Survey, the Children's Bureau, and the Immigration Service. To many of these agencies important services have been rendered, including professional, as in the care and treatment of beneficiaries of the Coast Guard and Employees' Compensation Commission, and the protection of the health and welfare of governmental employees.

The facilities of the permanent hospitals of the service have been improved and extended, one feature of this extension being the establishment of a radio service for the relief of the sick on vessels at sea. Use has been made of the radio service also in the broadcasting of public health information, this last-mentioned work being conducted at a nominal expense.

Marked progress has been made in the study and development of industrial hygiene and in studies of stream pollution and the disposal of human wastes.

Rural sanitation, which has been developed to be one of the most important and productive of the cooperative functions of the service, has been extended with gratifying results. It is one of the most economical of the activities of the service from the standpoint of measurable returns.

The inauguration of a series of public health institutes in a number of large cities in different parts of the United States gave an impetus for improved health conditions that will unquestionably be

of great value. With the advancement of health work and the demands for it throughout the country generally there has come a recognition of the need of trained workers in this field. A conference on the future of public health in the United States and the education of sanitarians was accordingly convened at Washington in March, 1922, under the auspices of the service. The attendance included deans of universities and eminent sanitarians, whose positions and training qualify them to deal with these problems. Some of the most important recommendations of this conference will be found in that part of this report which treats of educational measures.

One of the scientific accomplishments of the year was the development of a new gas for the fumigation of vessels for the purpose of destroying disease-bearing insects and vermin. The application of this gas in the manner indicated has been studied and tried out by the Division of Scientific Research in cooperation with the Chemical Warfare Service of the United States Army. Present indications are that it is effective, that it can be applied with safety, and that it does not damage either vessel or cargo. These qualities have not heretofore been obtained to a satisfactory degree with any gaseous disinfectant.

Among the endemic diseases which have been made the subject of extensive studies during the present fiscal year may be mentioned amebiosis, botulism, gonorrhea, leprosy, malaria, meningitis, pellagra, pneumonia, Rocky Mountain spotted fever, syphilis, tuberculosis, trachoma, tularaemia, and typhoid fever.

The results of the draft for the late war revealed astounding conditions prevalent in the United States with respect to venereal disease infection. Public opinion crystallized rapidly and resulted in the institution of measures designed to control these diseases. The necessity for and the value of this work are now so well established as to place it eventually on a permanent basis in all the States. It is believed that these diseases and the disastrous conditions that develop late in their course are being diminished. Furthermore, research work which is in progress gives promise of greatly improved methods of treatment, particularly in the cases of paresis and locomotor ataxia, which are late manifestations of syphilis.

In accordance with its plan of organization under law the work of the bureau is conducted through seven different divisions, the reports of which follow.

SCIENTIFIC RESEARCH DIVISION.

In charge of Asst. Surg. Gen. J. W. Shereschewsky.

During the past year the Scientific Research Division has, as in previous years, carried on investigations of diseases of man and the pollution of streams to the fullest extent compatible with its appropriations. Some of the diseases studied were: Amœbiasis, botulism, pellagra, Rocky Mountain spotted fever, tularaemia, leprosy, malaria, meningitis, pneumonia, smallpox, plague, syphilis and related diseases, tuberculosis, and typhoid fever.

The investigations of the division in child hygiene, industrial hygiene, stream pollution, excreta disposal, and public-health organization were continued. The cooperative work for the control of trachoma was continued as heretofore by the division, an additional hospital being opened in cooperation with State and local health authorities. Demonstrations were made of rural health work and malaria control. An investigation was also begun to determine whether clonorchiasis or infection with the fluke known as *Clonorchis sinensis*, which is frequently found present in arriving aliens from the Orient, could spread in the United States because of the natural conditions.

Investigations of botulism as a phase of food poisoning have been enlarged to include a study of food poisoning from other causes, such as the organisms of the paratyphoid, enteriditis, and proteus groups. Numerous studies have been made of reported outbreaks of disease following the ingestion of food which was suspected of containing such organisms, efforts being made to focus attention on all outbreaks of food poisoning in the hope of stimulating fuller and better reporting of this condition.

Important studies were also made at the Hygienic Laboratory, particularly in relation to the basic principles of chemotherapy of disease and oxidation-reduction processes, with special reference to their application to biological phenomena of public health importance.

In the spring of 1922 active work was begun on the investigation of Rocky Mountain spotted fever at the field laboratory in Hamilton, Mont. This disease is dependent for its transmission upon an intermediate host. It may be classed among those diseases which possibly confer a lasting immunity; and, as in the case of other diseases of this character, it is believed that there is reason to hope for the working out of a successful method of immunization against it. The investigation resolved itself into two main lines—first, the study of the relationship the disease bears to ticks and animals in nature with the idea of improving practical methods of control or eradication of the disease among animals; and second, the study of the phases of the virus occurring in ticks in the hope of so modifying or attenuating the virus that it will lose its infectivity and yet retain its immunizing properties.

In spite of the diversity of the activities of the division there is a wide field in which the necessity is urgent both for increasing the present activities of the service and undertaking new lines of systematic research. The present researches of the service in respiratory and nutritional diseases and in tuberculosis should be extended. The increasing prevalence of cancer, which now stands approximately fifth on the list of mortality returns, calls for immediate efforts to make a study of this disease in its relation to the public health in the hope of outlining systematic studies which might point the way toward possible means for reducing this prevalence. It is earnestly hoped that means will be found at no distant date for extending the research activities of the Public Health Service in these directions.

In view of the increasing importance of fundamental physiological problems in the causes and prevention of disease, the desirability of adding a division of physiology to the Hygienic Laboratory has become one of urgent importance. The addition of such a division to the laboratory and the acquisition of some additional space for the prosecution of this work are matters which merit early and favorable consideration on the part of the Congress.

The investigations of industrial hygiene have been continued throughout the year along the broad lines previously followed. The guiding principle which has been followed is the practical value of the studies to the industrial employee and to industry. The problems for study were, therefore, selected with the idea of relative values in mind so as to affect the greatest number of workers and to eliminate those conditions having the greatest bearing on industrial morbidity rates. While the law should protect the worker against the health hazard of work processes, it should not be forgotten that regulatory measures must be based on scientific investigations which will provide basic protection against such hazards without unnecessary requirements which increase the expense or difficulty of enforcement without a corresponding increase in the factor of safety. Among the problems studied during the year may be mentioned: Standards of illumination, the dust hazards, methods for preventing cutting oil dermatoses, the relation of zinc to brass founders' ague, and the effects of high temperatures and humidities in the production of undue fatigue. The work of assembling data for a standard industrial sanitary code was also actively prosecuted, considerable advance being made in this respect. Studies were also undertaken with a view to improving the artificial and natural ventilation of vessels following fumigation with hydrocyanic acid gas and to devising means for increasing the safety of this procedure.

In the studies of child hygiene made during the year surveys have been conducted or work carried on in 10 States. It is expected that the program will be shortly extended to include two other States. In carrying on these investigations the desirability of fostering the development of State and local health agencies for child hygiene has been steadily kept in mind with the result that in a number of instances these studies of the service have resulted in establishing or developing the work of permanent child health organizations supported by State or local funds. An intensive study has been planned and is being carried out to establish more accurate standards of normal physical development for the children of the various age groups. Particular attention has also been paid to the effect of oral conditions upon the

health, growth, and development of children. Studies of nutrition and observations of underweight in children have been carried out and an active information service to mothers and expectant mothers has been maintained. Fourteen special articles and reports relating to child hygiene have been published in the Weekly Public Health Reports during the fiscal year.

The malaria problem in the United States has actively engaged the attention of the division during the year. Were malaria to be eliminated in the regions where it is still prevalent, it is safe to say that the health and prosperity of the inhabitants of these regions would be improved some 30 per cent. The Public Health Service has continued to cooperate with State and local boards of health and with the International Health Board of the Rockefeller Foundation in attacking the problem of malaria in the United States through the making of surveys at the request of State health authorities and in devising and proposing to malarious communities programs of malaria reduction and control. Such programs have been carried out at the expense of State and local funds and by contributions of the International Health Board, the Public Health Service furnishing the expert supervision and guidance necessary. In cooperation with State health departments, assistance has been rendered by the service to railroads in reducing malaria where this disease is affecting their employees and groups of the population in the territories which they serve. The results from adopting the programs for malaria control devised and recommended by the service have been very encouraging. During the year laboratory and field investigation of malaria were also actively carried on, considerable progress being made in studying such matters as new larvicides, the fish control of mosquito breeding, and field methods for the elimination of malaria.

During the fiscal year studies of the Illinois River undertaken in cooperation with the Chicago Sanitary District as outlined in the previous annual report were continued. The collection of field data has practically been completed and there now remains only the analysis of the results. The object of these studies was to extend the data already collected by the service regarding the processes of natural purification of streams and to furnish reliable data which could be used in plans for the future development of the proper disposal of the waste from the Chicago Sanitary District. In addition to this, studies were continued during the year with reference to hydrogen ion concentration in relation to water purification.

The plan of cooperative rural health work during the past fiscal year included projects in 56 counties (or districts comparable to counties) in 16 States. The demonstrations were carried out along lines practically identical with those of the previous year. This plan is both economical and effective under a wide range of local conditions. According to data collected by the service the number of counties or equivalent divisions provided with local health service under the direction of whole-time county or district health officers was 203 at the beginning of the calendar year 1922 as against 161 at the beginning of the calendar year 1921. The stimulating effect of the cooperation by the Federal Government in these projects is shown by the proportion of the expenses covered with funds from local sources, which was during the past fiscal year eight times the amount spent by the Public Health Service for this purpose.

The control of biologic products as required by the law of July 1, 1902, regulating the sale of viruses, serums, toxins, and analogous products in interstate traffic, has been continued under this division. During the year diphtheria toxin-antitoxin mixture and material for the Schick test were added to the list of biologic products over which the Public Health Service now exercises supervision and control. In connection with the supervision of the last-mentioned products much work has been done in the establishing of satisfactory standards of purity and potency, and methods of marketing and preservation. Smallpox virus has also received much attention both with respect to the purity of the product and the means for improving its potency.

The division has through its various field officers cooperated with other Government bureaus and private associations in furnishing information and carrying on investigations of various kinds, and has arranged for the representation of the service at public health and scientific meetings, and for the giving of popular lectures by service officers before meetings widely diverse in character.

The foregoing summary touches but briefly on the work of the division. The following discussion gives in much greater detail an account of the work done during the past fiscal year:

FOOD POISONING.

During the year 1922, in accordance with a request made by the National Cannery Association, investigative work on food poisoning in general was undertaken by the Public Health Service in order to supplement the studies of botulism previously conducted. Epidemiologist J. C. Geiger was detailed to make these studies in cooperation with the University of Chicago, Prof. E. O. Jordan of the department of hygiene and bacteriology being designated as consulting hygienist of the service to have supervision of the investigations. The studies of botulism were continued as during the previous year, an effort being made to determine the factors responsible for the increasing prevalence of this disease by means of epidemiological studies, bacteriological examinations of soil from different localities, investigations of canned foods, and experiments with animals. Work on the standardization of botulism antitoxin was done at the Hygienic Laboratory (see p. 67). * * * With respect to general studies of poisoning by food and water infected with organisms of all kinds, including *B. botulinus*, the aim was to lay the foundation for a broad study of the classification of the causes of disease from these sources. The need for a better understanding of the term "food poisoning" and for a regrouping of these infections was indicated by the importance of assigning correct causes and the difficulty which had been experienced on account of confusion in diagnosis. The investigations were carried forward by means of field and laboratory studies, outbreaks being studied where they occurred and bacteriological examinations being made in the laboratory of the University of Chicago and at the Hygienic Laboratory. A letter was sent to all State health officers indicating the scope of the investigation, with the intention of focusing attention on all such outbreaks and stimulating fuller and better reporting of this condition.

As a result of experimental work with the paratyphoid, enteriditis, and proteus groups, in order to find out whether food poisonings must be due to or associated with some degree of spoilage or putrefaction in suspected food, the following observations were made:

1. This group of organisms grows readily in most canned foods except fruits.

2. There are no noticeable changes in odor, appearance, or texture of the food except in milk.

Feeding experiments on guinea pigs with the spores of *B. botulinus* yielded data from which the following points were developed:

1. Considerable variation as to the susceptibility of guinea pigs to botulinus intoxication with spores has been observed.

2. There is a remarkable difference of results in animals inoculated subcutaneously and fed with spores.

3. Spores may remain latent in tissues of animals for many weeks without the animal showing any indication of the disease.

4. It is comparatively easy to isolate the spores of *B. botulinus* from practically every tissue of the body after feeding or subcutaneous inoculation of the spores.

Epidemiological studies were made of two outbreaks:

Kendallville, Ind.—In March there occurred an outbreak of botulism in the Lakeside Hospital, with 8 cases and 4 deaths. The causative food was commercially canned spinach.

Rockford, Ill.—On April 8, 1922, an explosive outbreak of an illness designated as food poisoning and characterized by symptoms of nausea, vomiting, diarrhea, and extreme prostration, but which apparently completely subsided in 48 hours, occurred at the Rockford School for Girls. This outbreak both epidemiologically and bacteriologically seems to have been proved to be caused by the paratyphoid *A. bacillus*, whose origin was milk. That this bacillus was isolated from a pasteurized supply is of interest, but it must be understood that this supply was unchecked as to temperature, and therefore no absolute conclusions can be drawn except that faulty technique is suggested.

From a survey of all the work done several important deductions may be drawn. The causes of general food poisoning should be thoroughly examined, as the cases from other causes far outnumber those attributed to botulism intoxication. Mortality statistics show a steady increase in the number of cases of food poisoning. Several distinct diseases contribute to the diagnosis "food poisoning." Among them are typhoid, paratyphoid, infections with the enteriditis group, and botulism. For correct diagnosis the isolation of the organism is always necessary whether from the excreta of the patient or from the suspected food, or from both. This applies especially to conditions caused by the paratyphoid group. In cases of suspected botulism the isolation of the spore may mean nothing but the demonstration of the toxin means everything. Physicians should be taught to scrutinize from every angle their diagnoses in alleged food poisoning cases. Preventive measures depend first of all upon a clear understanding on the part of the health authorities and medical profession of the importance of epidemiological investigations and laboratory procedures in outbreaks of suspected food poisoning. Laboratory facilities and investigators should be made available by all health departments.

MALARIA INVESTIGATIONS.

The activities of the service in the investigation of malaria and in demonstrations of malaria control methods were continued during the fiscal year 1922 under the direction of Surg. L. D. Fricks, with headquarters at Memphis, Tenn. For convenience these activities may be considered under two broad heads, namely, (1) technical studies of malaria, (2) investigations and demonstrations of malaria control measures. Actually there is considerable overlapping between these two arbitrary groups of service activities since practically all investigations of malaria were conducted with a view to determining feasible methods of controlling the disease, and frequently in carrying out demonstrations in malaria control some new method presented itself which warranted the most careful technical study.

TECHNICAL STUDIES OF MALARIA.

Technical studies of malaria were conducted (1) in the malaria laboratory at Memphis, Tenn., and (2) in the field.

(1) LABORATORY INVESTIGATIONS.

During the year the malaria laboratory at Memphis, Tenn., was transferred from Eve Hall to a newly erected laboratory building. This building, designed and fitted as a laboratory, is used as a consolidated laboratory by the medical department of the University of Tennessee, the Tennessee State Board of Health, the City Health Department of Memphis, and the United States Public Health Service, with Acting Asst. Surg. William Krauss as director.

Clinical studies of malaria cases in the Memphis General Hospital have been conducted in connection with the laboratory. Evidence bearing upon the adequacy of the standard quinine treatment for malaria has been collected; the value of urobilin as an index of malaria has been carefully studied; and efforts have been made to determine a more delicate test for residual malaria infection.

(2) FIELD INVESTIGATIONS.

It is obvious that the majority of the technical studies of malaria must be pursued in the field where malaria and malaria mosquitoes are most prevalent. For this reason, field laboratories have been established at selected points where investigations were continued under the direction of Special Expert M. A. Barber. The laboratory at Camilla, Ga., was operated until the close of the calendar year 1921. This laboratory with its equipment and personnel was then transferred to Brewton, Ala., where the following investigations were continued or were added to those already under way:

Larvicide experiments.—Investigations of arsenic preparations as mosquito larvicides comprised a most important part of the year's studies. Many different preparations of arsenic were under investigation with the result that Paris green was found to be the most satisfactory for the purpose in view. Very careful studies were conducted covering the mechanical problems involved in the practical employment of this poison. Extensive demonstrations in the use of Paris green as a mosquito larvicide were satisfactorily made around

Brewton, Ala., and at Lake City, Fla. In addition to the studies of Paris green many other larvicides and culicifuges including paradichlorobenzene, creosote, chloracetophenone, and many popular proprietary preparations were under observation.

Observations on seasonal prevalence of Anopheles species and malaria types.—The observations of these two highly important subjects which were begun in Mitchell County, Ga., were completed and similar observations undertaken in Escambia County, Ala. The findings in Escambia County up to mid season were practically the same as those reported from Mitchell County, Ga. During the winter and spring months *A. crucians* and *A. punctipennis* are decidedly predominant. Beginning in May *A. quadrimaculatus* shows a marked increase while *A. punctipennis* shows a corresponding decrease in prevalence, *A. crucians* persisting in abundance through June. During July, August, and September *A. quadrimaculatus* is the predominating species in the region under observation.

Relation of domestic animals to the malaria problem.—The investigations of the attraction offered by certain domestic animals to Anopheline mosquitoes, which were undertaken in Mitchell County, Ga., were continued during the summer of 1921 and afterwards repeated around Brewton, Ala. Hogs and rabbits were mainly employed for these investigations, but the data secured up to the present time does not indicate that either of these animals can be advantageously employed as a protection against malaria mosquitoes in the southern United States.

Biochemical studies of mosquito-producing areas.—Investigations of hydrogen ion concentration in mosquito-producing bodies of water have been undertaken. Observations were made of the effects of decaying plant life on mosquito production. These investigations have not been completed but they are considered highly important because of the fact that very slight and heretofore undetermined differences in nearby bodies of water may greatly influence mosquito production, one producing mosquitoes profusely, the other not at all.

Mosquito surveys.—Careful surveys of mosquito-producing areas were made around Brewton, Ala.; on Ship and Cat Islands, off Gulfport, Miss.; and around Lake City, Fla.

A. punctipennis investigations.—Investigations of *A. punctipennis* infectivity and the relative importance of this species of Anopheles in the transmission of malaria under natural conditions were continued during the year. Mosquito surveys were made during the spring of 1922 for the purpose of locating a place in which both malaria and *A. punctipennis* mosquitoes were common, and, suitable conditions having been found at Florence, Ala., a field laboratory was established there.

Epidemiological studies of malaria.—The peculiar difficulties encountered in securing accurate information relative to the prevalence of malaria in any community have long been appreciated. Since such information is necessary for the economical direction of malaria control efforts and in measuring the effectiveness of methods of control employed, comprehensive epidemiological studies of malaria have been undertaken. Considerable progress in this investigation has been made in the direction of evaluating available malaria morbidity and mortality reports by checking these records with other special methods such as histories, spleen and blood indices in certain

selected areas. Progress has also been made in stimulating more accurate reporting of malaria to the various State health departments. Epidemiological studies of malaria are now being conducted in Alabama, Mississippi, and in southeast Missouri.

Malaria surveys of school children.—The importance of malaria infections upon the growth and development of children in the malarious regions of the United States has not in the past received the attention to which it is entitled. The seriousness of this matter has been strongly presented to the various health agencies concerned during the past year; the State health officers interested have been advised to conduct malaria surveys among the school children of the rural districts, and many such surveys have been made from this office. Malaria surveys were made of school children in Mitchell County, Ga. (resurvey); Dunklin, Pemiscot, Cape Girardeau, New Madrid, Stoddard, and Butler Counties, Mo.; Escambia County Ala.; Jackson and Alexander Counties, Ill.; and Fulton County, Ky. More than 174 schools were surveyed and 5,998 children examined. Arrangements were also made with the Division of Child Welfare to assist their investigators in collecting information relative to malaria prevalence and importance among the school children where investigations or studies in child welfare are being conducted.

Fish investigations.—The Bureau of Fisheries continued its valuable cooperation with the service in the investigation of fish as a means of mosquito control by again detailing Ichthyologist Samuel F. Hildebrand to continue his studies of this very important phase of mosquito control. Careful observations of the habits of *Gambusia affinis* have been conducted in the vicinity of Augusta, Ga. Inspections of localities in the Southern States where *Gambusia* were employed in controlling mosquito production have been made, and advice given relative to the installation and care of *Gambusia* hatcheries and the wider distribution of these fish in malarious sections of the country.

INVESTIGATIONS AND DEMONSTRATIONS OF MALARIA-CONTROL MEASURES.

The service continued its policy of furnishing direction, assistance, and advice, when requested by the proper authorities, to communities undertaking malaria control. These activities have been continued under the immediate direction of Senior Sanitary Engineer J. A. LePrince with a personnel of 1 passed assistant surgeon, 1 epidemiologist, and 8 sanitary engineers. In order to meet the demands made for supervision and advice in connection with urban malaria-control demonstrations, 7 additional sanitary engineers were furnished by the International Health Board and assigned to malaria duty from this office, and 1 physician and 11 sanitary engineers were employed and assigned to cooperative malaria work by the State health officials, who have entered into the cooperative agreement for malaria control. The activities of the service in malaria control may be grouped as follows: (1) Cooperative malaria control and (2) assistance and advice in malaria control furnished noncooperative communities.

COOPERATIVE MALARIA CONTROL.

The cooperative agreement for malaria control, which was entered into in 1919 between the Public Health Service, the International Health Board, and the health officials of 10 States, has been continued in successful operation since that time. Three additional States have entered into this agreement, so that at the present time 13 States, or every State in the Union which has a serious malaria problem, with the possible exception of one, is actively conducting malaria control on a permanent basis as a part of its other health activities. Under this cooperative agreement the Public Health Service made malaria surveys, prepared estimates of cost of malaria control measures, and furnished supervision of the control demonstrations and advisory supervision of their maintenance. The State health authorities selected the communities in which demonstrations were to be conducted and together with the local authorities provided necessary funds to cover the cost of malaria control. Where the State and local authorities were unable to provide all of the necessary funds, these were supplemented by the International Health Board. In carrying on demonstrations in malaria control it has been the policy of the service to advise the selection of communities best suited for successful demonstrations; to furnish careful supervision of drainage construction during the first year and advisory supervision of maintenance during the second year, with the expectation that after that time the community will continue its own antimalaria work and will require only occasional advice relative thereto.

The foundation of the cooperative malaria-control program has been demonstrations in urban malaria control, but every effort has been made to expand the successful demonstrations as rapidly as possible to include the surrounding rural districts and at the same time to graft the program of malaria control onto the general health program of the State and local health authorities. So successful has been this policy that 12 States have allotted more than \$60,000 for malaria control during 1922, and 25 counties have conducted county-wide demonstrations in malaria control as an important part of their health activities. County-wide malaria control is still in the investigational stage and is being carried on by the 25 counties along different lines and with differing degrees of effectiveness. In two counties (Yazoo County, Miss., and Cherokee County, Tex.) intensive investigations and demonstrations are being made of all approved methods of malaria control on a cooperative program similar to that under which urban malaria-control demonstrations are conducted. In some counties limited drainage has been the most important feature of the malaria-control program, while in others rural malaria control by whatever method seems most applicable to local conditions has been carried on under advice furnished from this office.

During the season of 1921, after June 30, advisory supervision of malaria control was furnished to 35 of the 45 communities which had undertaken cooperative malaria control during 1920; and supervision of construction work was continued in 25 towns which began malaria control in 1921. In 1922 advisory supervision was furnished 25 towns which had undertaken cooperative malaria control the previous year; and supervision of construction work was furnished 27 towns in which the work was begun for the first time. The

amounts expended for malaria control, exclusive of supervision, in new cooperative units during 1921 equaled \$67,580. The amounts expended for maintenance, exclusive of supervision, in cooperative units beginning work previous to 1921 was \$41,190. The amounts expended for maintenance in noncooperative units or towns beginning malaria control previous to 1920 equaled \$164,910, giving a total of \$273,680 known to have been expended during the calendar year 1921 for malaria control in the United States. Because of the fact that the fiscal year divides the malaria season in half, it is extremely difficult to give figures which clearly show amounts expended and the number of communities interested in malaria control when they are prepared on a fiscal year basis; therefore, the following tables have been prepared on a seasonal basis, since it is believed they will prove to be more satisfactory to those concerned in malaria control.

TABLE A.—*Cooperative urban demonstrations begun in 1920.*

State.	Number of demonstration towns (1920.)	Area controlled (square miles).	Population protected.	Cost, initial year (1920).			Number of towns continuing work in 1921.	Estimated cost second year (1921), total.	Actual expenditures, second year (1921).		
				Total.	Per acre.	Per capita.			Total.	Per acre.	Per capita.
Alabama.....	6	26	27,057	\$18,217.95	\$1.09	\$0.67	5	\$4,550.00	\$5,292.28	\$0.52	\$0.20
Arkansas.....	4	15	15,225	8,963.86	.93	.59	3	6,000.00	3,550.00	.67	.31
Georgia.....	3	24.5	21,659	9,191.08	.59	.42	2	5,300.00	6,870.00	.61	.32
Louisiana.....	3	17.5	35,673	15,325.29	1.37	.43	1	3,346.00	3,500.00	1.24	.16
Mississippi.....	5	13.3	20,024	12,663.52	1.49	.63	5	2,467.00	1,799.87	.21	.09
North Carolina.....	3	11	19,100	24,018.42	3.41	1.26	3	10,200.00	8,055.05	1.15	.40
South Carolina.....	3	22.5	12,100	42,091.23	2.92	3.48	3	10,540.00	10,360.25	.72	.86
Tennessee.....	2	8.9	9,604	4,227.38	.74	.44	1	1,200.00	396.00	.11	.06
Texas.....	14	49	36,813	20,179.33	.64	.55	13	5,954.00	2,961.91	.11	.09
Virginia.....	2	4.2	2,475	6,249.56	2.33	2.52	1	1,200.00	896.58	2.34	.55
Total.....	45	191.9	199,730	161,127.62	1.31	.80	37	50,757.00	43,645.92	.43	.25

NOTE.—Table "A" showing actual expenditures for 1921 maintenance in cooperative urban demonstration towns begun in 1920 is a revision of table "A" which was submitted with the last annual report. It is intended to show actual expenditures for maintenance instead of estimates as previously given, and is made necessary by the fact that figures for actual expenditures are not available in mid-season.

TABLE B.—*Cooperative urban demonstrations begun in 1921.*

State.	Number of demonstration towns in 1921.	Area controlled (square miles).	Population protected.	Cost, initial year (1921).			Number of towns continuing work in 1922.	Estimated cost, second year (1922).		
				Total.	Per acre.	Per capita.		Total.	Per acre.	Per capita.
Alabama.....	4	4	3,571	\$2,673.27	\$1.04	\$0.69	4	\$1,200.00	\$0.47	\$0.31
Arkansas.....	2	7	6,700	3,563.31	.80	.53	1	960.00	.50	.30
Georgia.....	2	9	6,560	4,741.00	.82	.72	2	1,520.00	.26	.23
Louisiana.....	1	10	15,000	4,965.13	.78	.33	1	3,649.20	.57	.24
Mississippi.....	5	15	14,088	12,361.54	1.29	.88	5	5,750.00	.60	.41
North Carolina.....	1	3.5	2,000	6,234.23	2.79	3.12	1	600.00	.27	.39
South Carolina.....	2	8.5	3,788	5,729.60	1.05	1.51	2	1,625.00	.30	.43
Tennessee.....	2	8	9,100	4,736.97	.93	.52	2	2,180.00	.43	.24
Texas.....	7	15.5	11,523	6,989.44	.71	.61	7	1,576.00	.16	.14
Total.....	26	80.5	72,630	51,994.49	1.01	.72	25	19,060.20	.39	.26

TABLE C.—*Cooperative urban demonstrations begun in 1922.*

State.	Number of towns.		Area control, square miles.	Population protected.	1922 appropriations.				Estimated cost, initial year (1922).		Expended to June 30, 1922.
	Surveyed.	Selected.			Local.	State.	International Health Board.	Total.	Per acre.	Per capita	
Alabama.....	49	3	26.5	65,880	\$30,415.88	\$3,456.50	\$3,456.50	\$37,328.88	\$2.20	\$0.57	\$15,850.04
Arkansas.....	6	4	10	25,908	3,856.65			3,856.65	.60	.15	2,563.50
Georgia.....	6	3	11.25	13,163	5,830.60			5,830.60	.81	.38	2,024.24
Illinois.....	6	1	7.5	6,267	2,000.00		1,000.00	3,000.00	.63	.48	463.07
Louisiana.....	4	1	1	3,385	1,000.00	1,000.00		2,000.00	3.12	.59	211.72
Mississippi.....	13	5	15.25	25,102	6,116.68	1,529.16	1,529.16	9,175.00	.94	.37	2,278.79
South Carolina.....	7	5	29	5,401	12,700.00	6,800.00	6,800.00	26,300.00	1.42	4.86	19,691.89
Virginia.....	5	5	8	25,456	13,725.00	2,062.50	2,062.50	17,850.00	3.48	.70	7,890.32
Total.....	96	27	108.5	172,562	75,644.51	14,848.16	14,848.16	105,341.13	1.52	.61	50,973.57

ASSISTANCE AND ADVICE TO NONCOOPERATIVE COMMUNITIES.

Although the cooperative malaria-control program has assumed the most prominent place in the activities of the service for malaria control, there remains a small field which can not be classed as cooperative malaria control. Every effort has been made at malaria field headquarters to restrict this field and to encourage the expansion of cooperative malaria-control work, but it has been found that some communities, although unable to meet the financial obligations specified in the cooperative agreement for malaria control, are desirous of conducting limited control campaigns. Various isolated industrial plants have carried on malaria-control operations as a protection to their employees and have requested advice relative thereto. The same can be said for many large planters and lumbermen living or operating in malarious sections of the country. In addition, communities in which demonstrations of urban malaria-control were made previous to 1921 frequently ask for advice relative to some problem which has arisen in their maintenance of malaria-control work. All requests of this character referred to above are given careful consideration, and the advice of a sanitary engineer trained in malaria control has frequently been furnished after the State health officer concerned has been informed of the action deemed proper in each instance.

MALARIA AND MOSQUITO CONTROL AROUND SERVICE HOSPITALS.

The medical officer in charge of field investigations of malaria was continued in supervisory charge of malaria and mosquito-control operations around certain service hospitals in which disabled soldiers were treated, until these hospitals were turned over to the Veterans Bureau just before the close of the fiscal year. Under this arrangement supervision of antimalaria operations was furnished at the following hospitals:

Hospital No. 25, Houston, Tex.
 Hospital No. 26, Greenville, S. C.
 Hospital No. 27, Alexandria, La.

Hospital No. 29, Sewells Point, Va.
Hospital No. 35, St. Louis, Mo.
Hospital No. 42, Perryville, Md.
Hospital No. 44, West Roxbury, Mass.
Hospital No. 62, Augusta, Ga.
Hospital No. 74, Gulfport, Miss.

Six of the sanitary engineers engaged in malaria-control investigations, in addition to their other duties, were assigned to this work. Their duties in this connection were to make malaria surveys around the hospitals, prepare estimates of cost for antimalaria work, advise the medical officer in charge of the hospital as to the methods of control best suited to his hospital, make such inspections of the work as were necessary in order to insure its successful prosecution, and to keep malaria field headquarters advised of the recommendations made and the progress and maintenance of the work at each hospital.

The sum of \$19,180 was expended for malaria and mosquito control around these hospitals during the fiscal year.

INVESTIGATIONS OF MALARIA AS AFFECTING COMMERCE.

While malaria is a rural disease and its blighting effects fall first on agriculture, they react at once upon the industries and commercial life of the community. For this reason investigations of malaria as affecting railroads and industrial plants have been for several years an interesting subject for study by the service. It has been found easy to interest captains of industry in malaria control because of the immediate returns in more efficient labor, and railroad officials are beginning to realize the indirect benefits which will accrue to the railroads from increased agricultural development and increased freight when malaria has been placed under control. Through the cooperation of the State health officer of Georgia a sanitary engineer was assigned to the duty of inaugurating and investigating malaria, control methods along the Central of Georgia Railroad. The work of malaria control along this railroad has been highly successful. Through the cooperation of the State health officers of Missouri, Arkansas, and Louisiana, a malaria survey was made of the Missouri Pacific Railroad. This survey was undertaken at the request of the officials of the Missouri Pacific, its object being to show them the extent of their malaria problem and to interest them in malaria-control measures. The scope of the survey was as follows:

- (a) To determine the prevalence of malaria among railroad employees.
- (b) To outline the extent of the malaria problem along the road.
- (c) To make recommendations for malaria control.
- (b) To prepare estimate of cost of malaria control.

IMPOUNDED WATER SURVEYS.

The study of impounded waters and their relation to malaria prevalence was continued during the year. These investigations are considered to be of great value because of the importance which the development of water-power projects is assuming in many potentially malarious regions of the United States. It has been observed that on relatively large projects in which lakes 10 to 20 miles in length are

artificially constructed conditions favorable to the production of Anopheline mosquitoes and malaria are very apt to occur during the two-year period immediately following the impounding of the water, and that in a body of water of this character the most favorable *Anopheles quadrimaculatus* production areas are located in the inlets and arms of the lake, usually around the upper end. It has also been noted in many instances that after the third year the malaria-mosquito production in these bodies of water is greatly reduced, probably because the natural enemies of the mosquito larvæ have by this time become sufficiently well established to check prolific mosquito production. It has been concluded, therefore, that if it were possible to introduce a sufficient number of larvæ-destroying fish at properly selected strategic points at the time the water is first impounded, this two-year period of greatest danger from malaria might be avoided or the danger greatly minimized. Investigations on the subject were conducted on the Coosa River in Alabama, above the site of the Mitchell Dam, where a large impounded water project is under way. Near the upper ends of the various arms of this lake fish ponds have been installed and stocked with *Gambusia affinis*. Seventy-four of these fish hatcheries have been built, stocked, and kept under close observation for several months. Mitchell Dam will be completed at the end of the present year, and it is intended that the rising waters of the lake shall flood the fish hatcheries and release many thousand *Gambusia* at selected sites where they will prove of greatest use in destroying mosquito larvæ.

PELLAGRA.

At the close of the fiscal year 1921 the following field investigations of pellagra were under way:

1. A study of the preventive value of selected food factors.
2. A study of the effects of economic depression on pellagra incidence.

The systematic study of the pellagra preventive value of the several known essential dietary factors singly and in combination begun during the fiscal year 1921, was continued at the Georgia State Sanitarium throughout the fiscal year 1922.

Some of the results of this study were embodied in a special report published in the Public Health Reports of March 3, 1922. These indicated that neither a deficiency of minerals nor of the known vitamins was probably the primary cause of the disease, since failure to prevent the recurrence of pellagra was observed in several individuals who had consumed a diet believed to be rich in these factors. This left, of the known dietary essentials, only the protein or amino-acid factor for consideration.

Accordingly during the second half of the fiscal year studies were begun in a preliminary way designed to test the soundness of the deduction that the preventive factor in diet is bound up with the protein moiety. In connection with these studies, feeding experiments at the Hygienic Laboratory were begun early in January, 1922, on dogs, and some weeks later were extended to rats.

Although these studies at the Georgia State Sanitarium and the Hygienic Laboratory are still in progress at the close of the fiscal year and have not advanced to a point warranting definite conclusions the indications are that results of great value will accrue.

As was stated in the report for the fiscal year 1921, the development of a serious economic depression in the late summer of 1920 made it desirable to study in an intensive way the effect of this depression on pellagra incidence. With this object in view the observation of pellagra in a mill village of South Carolina that had been continuously studied from early in 1916 to late in 1920 was resumed in January, 1921, and continued into the fall of the year.

The data collected during this period are being studied in connection with those collected during the period 1916-1920. At this time it may be stated that broadly the facts indicate that the economic depression was followed in 1921 by an increase in pellagra incidence, in the village studied, of approximately 150 per cent over the incidence in 1920. This is a fact of great significance quite apart from pellagra: it forcibly suggests that in times of economic depression a large section of our population tends to subsist on a diet inadequate for proper nutrition with all the deplorable consequences, physical, social and economic, that this implies; it suggests, too, that there is need for a wider diffusion among the people of knowledge of what constitutes an adequate diet.

The observations made and recorded at the pellagra hospital of the service at Spartanburg, S. C., during the period of its operation 1914-1920 of the preventability of pellagra by means of one substantial meal furnished to a series of out-patient pellagrins were summarized by Passed Asst. Surg. G. A. Wheeler in a paper which was published in the *Journal of the American Medical Association* of April 1, 1922. One supplemental meal of fresh meat, milk, vegetables, fruit, bread, and butter proved adequate to prevent recurrences of the disease.

ROCKY MOUNTAIN SPOTTED FEVER.

Upon request of the Montana State boards of health and of entomology, the Public Health Service, in September, 1921, assumed charge of the investigations of Rocky Mountain spotted fever which were being carried on in the Bitter Root Valley. At this time a field laboratory was established at Hamilton.

Laboratory studies began at once but extensive observations in the field were delayed until March, 1922, on account of the severe winter, and because ticks which transmit the spotted fever do not appear until the spring of the year.

The investigations have included, (1) the selection of certain limited areas which were carefully mapped for intensive study to determine the distribution of negative and topographical types, (2) the distribution of rodent species in relation to these types, (3) the relationship between the distribution of ticks and infected ticks to types and to the prevalence of rodents, (4) the study of the natural factors concerned in the occurrence of human cases, and (5) experimental studies on the nature and phases of the spotted fever virus.

The field studies on Rocky Mountain spotted fever as it exists in nature must necessarily be continued through several seasons to secure even reasonably complete information concerning the factors involved.

The more important results to date are as follows:

(1) Strong presumptive evidence has been obtained that, because of its importance as a host of adult ticks, the Rocky Mountain goat

is a vital factor in maintaining the large number of infected ticks found in certain mountain areas adjoining the valley; (2) tests of rodent blood and ticks found infesting rodents have indicated that Columbian ground squirrels, snowshoe rabbits, cottontail rabbits, porcupines, pine squirrels, and woodchucks are factors in spreading Rocky Mountain spotted fever infection among ticks; studies of other rodent species are under way; (3) observations concerning the relation of the type of country to the distribution of infected ticks, though not warranting any conclusion, point to the "open" type as the most dangerous.

Experimental studies of the virus have yielded results which indicate that the spotted fever organisms pass through a cycle in the tick body and at least two degrees of virulence are now recognized: first, an apparently nonvirulent phase which will not produce spotted fever when inoculated into laboratory animals but may render the animal immune, and second, a highly infectious phase which promptly develops after the tick receives fresh animal blood.

TRACHOMA.

During the year trachoma prevention work has been conducted in the same manner as in previous years. In addition to the five trachoma hospitals already established, a temporary hospital was opened in Pelham, Mitchell County, Ga., and in cooperation with the State health authorities a new hospital was established in Russellville, Ark.

The Pelham hospital was opened for the reception of patients on November 14, 1921, in a small modern well-equipped building with adjoining residence, furnished by the county. The only expense to the service, in conducting the Pelham hospital, was the salary of the doctor in charge and of the two trained nurses. The current expenses for subsistence, etc., were paid by Mitchell County. This clinic included, in addition to the trachoma cases, all diseases and conditions of the eye, and some of the nose and throat. This was done in compliance with a request of the local and State authorities and the local physicians, including the eye specialists. The operations, therefore, in addition to those for trachoma and its sequelae, included the removal of tonsils and adenoids, and operations on the eyeball—cataract, iridectomy, etc. The hospital was closed April 1, 1922. (See table of Pelham, Ga., clinic, p. 29.)

HOSPITALS.

At the expiration of the fiscal year, six hospitals were in operation as follows: Greenville, Jackson, and Pikeville, Ky.; LaMoure, N. Dak.; Morristown, Tenn.; and Russellville, Ark. The hospital at Jackson, Ky., has been there for some years, and the report for the past fiscal year shows a decrease in the amount of work done, indicating that this hospital has apparently served its purpose and probably had best be relocated in accordance with the service policy.

The amount of work done at the LaMoure, N. Dak., hospital also shows some decrease. The medical officer in charge of this hospital reports that there is considerable trachoma in the State but the cases are mostly Russo-German and it is with the greatest difficulty that these people can be induced to come to the hospital for treatment

and cure of their communicable disease. The need of more thorough cooperation of the State authorities in regard to this has been taken up and it is hoped that these trachoma cases can be reached either by inducing them to accept treatment in LaMoure or by moving this hospital to a more advantageous point.

Reference to the accompanying table of hospital relief (see p. 29) shows a very significant fact in that out of 1,019 cases, 9 had lost both eyes and 44 had suffered the loss of one eye, in other words, 53 (more than 5 per cent) had lost either one or both eyes from trachoma. This is almost double the percentage reported last year. (See also *Child Hygiene*, p. 41.)

The total number of trachoma cases recorded as cured during the year amounted to between 400 and 500. This means the foci of infection were reduced at least by that number. The same difficulty, however, has obtained in ascertaining the real number of cured cases, since the custom of these trachoma patients of failing to report after recovery has rendered it almost impossible to complete their records in regard to the result of treatment. This failure usually is due to the long distances these people live from the hospitals and the lack of means of transportation. Since the public-health phase is the paramount feature at all times, the trachoma prevention work has continued to be of an educational character in the interests of hygiene and public health.

An interesting fact in connection with the opening of the hospital in Arkansas is that large numbers of persons who show the mutilating effects of trachoma have come to the hospital from over a widely scattered territory, thus proving that the disease has been prevalent in that section for many years.

The cost of conducting the service trachoma hospitals during the past fiscal year has compared favorably with that of preceding years, and the strictest economy consistent with best results has been adhered to.

Field clinics.—Field clinics were held in various States. Fewer clinics were held during the year and fewer people examined than during the preceding year. This is principally due to the fact that in the past fiscal year all of the State institutions of Kentucky were examined and clinics held for the relief of trachoma cases. Owing to the limited personnel of the trachoma prevention work, it was not possible to comply with all requests for clinics.

COOPERATION OF STATES AND OTHER AGENCIES.

The thorough cooperation of the various States, including some financial aid, has been given in this work. The American Red Cross has a full-time paid representative whose exclusive duty is to cooperate and assist with the trachoma clinics. The local chapters of the Red Cross furnish practical assistance at the field clinics and provide practically a temporary hospital equipped with cots, bedding, linens, etc.; meals are also furnished for the patients who may have to remain for a few days for treatment. For those cases requiring prolonged post operative treatment the local community furnishes transportation to the nearest service trachoma hospital. The field clinics are conducted for about four days at each place.

Dispensary and hospital relief, operations, etc.

	Green- ville, Ky.	Jack- son, Ky.	La Moire, N. Dak.	Morris- town, Tenn.	Pike- ville, Ky.	Rus- sell- ville, Ark. ¹	Pel- ham, Ga. ²	Total.
DISPENSARY RELIEF.								
Old cases, all causes.....	515	1,311	263	965	1,082	141	831	5,108
Old cases, trachoma.....	220	712	108	726	580	113	580	3,039
New cases, all causes.....	554	645	448	698	1,261	290	1,388	5,284
New cases, trachoma.....	118	127	89	157	162	71	265	1,019
Total attendance.....	1,069	1,956	711	1,663	2,343	431	3,118	11,291
Total number of treatments.....	1,100	2,596	711	1,770	2,532	432	11,326	20,467
Average daily attendance.....	3—	5+	2—	4+	6+	6	23+	31—
Impaired vision from trachoma.....	82	98	46	39	142	67	55	529
Corneal opacity from trachoma.....	57	53	28	19	31	57	17	262
Blindness, both eyes, from trachoma.....	0	1	0	0	4	3	1	9
Blindness, one eye, from trachoma.....	14	4	0	0	14	9	3	44
Ulcer from trachoma.....	40	46	14	12	11	7	3	136
Pannus from trachoma.....	58	65	39	11	106	55	29	363
Entropion from trachoma.....	28	14	6	13	8	16	5	90
Trichiasis from trachoma.....	11	9	6	1	9	26	4	66
Photophobia from trachoma.....	83	114	29	62	101	48	66	503
Conjunctivitis.....	180	415	44	267	352	60	507	1,825
Glaucoma.....	0	0	0	1	0	1	1	3
Trachoma cases cured.....	50	27	42	6	108	8	200	441
HOSPITAL RELIEF.								
Remaining from previous year..	10	9	9	7	19	0	0	54
Admitted during year.....	146	176	139	168	276	49	302	1,256
Discharged during year.....	144	174	135	166	277	38	302	1,236
Remaining at close of year.....	12	11	13	9	18	11	0	74
Days' relief furnished.....	3,836	3,384	4,029	4,171	5,835	699	2,052	24,006
Rations furnished.....	5,618	4,672	5,401	5,565	7,273	1,075	.....	29,604
Cost of rations.....	\$3,044.41	\$2,609.59	\$1,994.61	\$2,714.03	\$3,143.01	\$553.67	.....	\$14,059.32
OPERATIONS.								
General anesthesia.....	17	4	17	16	32	6	90	182
Local anesthesia.....	106	133	44	290	163	63	291	1,080
Grattage.....	104	114	49	281	143	37	336	1,064
Entropion.....	18	24	10	13	9	21	8	103

¹ Established Apr. 18, 1922.² Opened Nov. 14, 1921; closed Apr. 1, 1922.

TYPHOID FEVER.

Lexington, Ky.—Upon request of the State health officer an investigation of an epidemic of typhoid fever in Lexington, Ky., was conducted by Asst. Surg. M. V. Ziegler, of the Public Health Service, from July 3 to 7, 1921. A study was made of 26 cases reported to the local board of health for the months of May and June and three days in July, 1921. The city of Lexington, with a population of 45,000, has had a low endemic report for typhoid fever for the past 10 years. The investigation soon indicated that the occurrence of the cases in the spring of 1921 was confined for the most part to a limited area. An examination of the sources of milk supply disclosed the fact that 21 out of 24 persons having the disease were supplied with milk from a certain station, and this led to the discovery of the source of the infection on a farm from which the milk was furnished to the milk depot. Upon enforcement of measures recommended by the service officer, the outbreak of typhoid was soon under control. Recommendations for the pasteurization of the milk supply, the use of antityphoid vaccine, and methods of disinfection were made for the protection of the city against the occurrence of similar outbreaks in the future.

INDUSTRIAL HYGIENE AND SANITATION.

During the fiscal year 1922 the work of the Office of Industrial Hygiene and Sanitation was continued under the direction of Surg. L. R. Thompson, headquarters being maintained at Washington, D. C., and a district office in New York City.

The activities conducted by the Office of Industrial Hygiene and Sanitation include: (1) Investigations into occupational health hazards in industrial plants; (2) studies of occupational diseases; (3) investigations concerning artificial and natural ventilation of vessels following fumigation by hydrocyanic acid gas and other gases; (4) study of causes of industrial absenteeism; (5) records of disability in hazardous occupations; (6) cooperation with Government departments; (7) cooperation with industrial and other agencies; (8) miscellaneous activities.

I. INVESTIGATIONS INTO OCCUPATIONAL HEALTH HAZARDS IN INDUSTRIAL PLANTS.

A. SURVEY OF THE GLASS INDUSTRY.

Because of abnormal conditions incident to the depression existing in the glass industry at the time the survey was conducted, it was not possible to conclude the investigation until late in the fiscal year, and it was then found necessary to extend the study further into the production of window glass, plate glass, and art or wire glass. Additional physical examinations of 368 male workers were made, extending the total to 1,510 male and 16 female employees. Statistical tabulations and interpretations are nearing completion, and it is expected that the report of this survey will be made some time during the ensuing fiscal year.

B. AIR CONDITIONING AND DUST CONTROL.

During the past year studies in air conditioning were conducted under the immediate supervision of Consulting Hygienist C.-E. A. Winslow at Yale University Medical School Laboratory, New Haven, Conn. A study was made of the flow of air through orifices and of the efficiency of various types of ventilation apparatus, a report of which appeared in the Public Health Reports for February 10, 1922.

In the Public Health Reports for April 14, 1922, a report was published of a survey of natural illumination in an industrial plant, with special reference to the use of the indoor-outdoor ratio in establishing standards of daylight illumination.

In the course of the studies conducted in certain munition plants during the war, a factory inspection form was devised which proved to be exceedingly useful in the work, and in order that investigators in the field of industrial hygiene and public health may have the advantage of consulting the form in connection with their work it was published in the Public Health Reports (January 6, 1922).

The exhaustive experiments which have been in progress relative to the distribution of air through straight and tapered ducts for suction currents, both with and without branch pipes, using, in the latter case, port holes such as are in common use in many ventila-

tion systems, have been completed. A report of this work will be published in the near future.

Some further studies have been made, as time permitted, concerning application of the Kata thermometer as an anemometer for air currents having velocities under 500 feet per minute. Also additional study has been made of the Konze konimeter, an instrument manufactured in South Africa and intended to serve as a dust sampling apparatus in order to ascertain its advantages, if any, over the Palmer dust-sampling machine. During the month of June arrangements were effected whereby the cooperation of the United States Bureau of Mines was secured in carrying on exhaustive experiments for determining the efficiency of the various types of dust-collecting devices and their practicability in field work.

C. STUDY OF THE HEAT HAZARD IN INDUSTRIES.

In connection with the study of the heat hazard in industry, certain investigations relative to high temperatures and high humidities are now being conducted in cooperation with the United States Bureau of Mines and the American Society of Heating and Ventilating Engineers. An experimental chamber has been constructed at the Pittsburgh Experimental Station of the United States Bureau of Mines. During the month of June experiments have been made with rather high temperatures, including one with a temperature of 100° F. and wet bulb of 98° F., with a relative humidity of 93 per cent; also some blood sugar determinations have been made.

It was not found possible to conduct any active investigation concerning the heat hazard in industries during the past year on account of lack of funds. However, laboratory studies were made on the ratio of nitrogen and sulphur contents of urine of men employed around furnaces in order that comparison might be made of the arduousness of their work with that of purely manual labor. With this ratio as an index it would seem that exposure to high temperatures produces evidence of fatigue as great as, if not greater, than that produced by purely manual labor of a not too exhausting nature. Analyses were made of the urine of two men subjected to heat exposure in the glass industry, the exposure being 130° F. for 30 minutes, followed by rest for a similar period, during the course of 8 hours. The results indicate an unusually high rate of oxidized sulphur excretion in one case and a moderately high rate in the other. In the case of the former the rate was increased over 100 per cent in three of five days, values never before encountered except in the case of Marathon runners.

D. OCCUPATIONAL HEALTH HAZARDS IN THE FOUNDRY TRADES, AND SUBSEQUENT ANIMAL EXPERIMENTATION RELATIVE TO BRASS FOUNDERS' AGUE.

The report of field studies made in connection with the survey of occupational health hazards in the iron and brass foundry trades was completed early in the year, although there remained to be accomplished a considerable amount of animal experimentation in connection with zinc and copper fumes. These experiments were commenced at the Hygienic Laboratory in November, 1921.

It became necessary to conduct preliminary experiments on guinea pigs in order to ascertain the amounts of zinc, copper, and nitrogen

excreted by the animals under normal conditions. It was found that zinc is present in minute quantities in carrots, cabbage, and oats. Feeding experiments showed that the major portion of zinc is eliminated in the feces and in the urine, particularly in the former. Chemical analyses of various tissues and organs of the guinea pigs showed that zinc and copper are distributed throughout the entire system. Detailed study was made as to the normal pulse, respiration, and temperature, and the factors which might account for fluctuations, this being necessary in order that proper comparisons might be made with the clinical manifestations noted after exposure of the animals to the fumes of metallic zinc.

On the conclusion of these preliminary experiments actual exposure of the animals was made for periods ranging from 45 to 60 minutes to the fumes of zinc oxide as generated by burning metallic zinc of known purity in a crucible placed in a specially constructed furnace. The most noticeable symptoms were respiratory embarrassment and shock. There were also noted initial subnormal temperature lasting for several hours, followed by a slight elevation and intermittent rises in temperature thereafter throughout the remainder of the period of observation. Heart symptoms were manifested by a rapid, weak, and irregular pulse.

In all animals killed after exposure the lungs were collapsed. This is of interest since the lungs of guinea pigs which die of anaphylaxis are distended.

II. STUDIES OF OCCUPATIONAL DISEASES.

A. INVESTIGATIONS INTO THE CHEMICAL AND PHYSIOLOGICAL ASPECTS OF INDUSTRIAL FATIGUE.

These studies have been conducted on a rather limited scale during the entire fiscal year. An experimental heat closet has been constructed, and observations are in progress as to the extent of fatigue produced by exposure to heat without regard to exercise. A résumé of the major work conducted during the year is presented below:

1. *Blood carbon dioxide*.—Carbon dioxide has been used as a means of determining the progressive tendency toward acidosis, which develops from fatigue produced as a result of heat exposure. A means of comparing this degree of fatigue with that produced by manual labor over a similar period is therefore presented. The tendency toward acidosis is progressive, and apparently death will result if the exposure is continued for a sufficient length of time. These experiments indicate that the higher the environmental temperature the more rapid is the tendency toward acidosis.

2. *Blood oxygen*.—A study has been made of the oxygen of the blood in conjunction with the study of carbon dioxide content for the purpose of determining the hæmoglobin content of the blood and whether it is sufficient to provide for the increased needs of the organism during the period of exposure. Apparently there is an increase in the hæmoglobin content for a time, followed by a gradual decrease, which probably is of significance as fatigue progresses.

3. *Blood solids*.—It is found that when there is a marked increase in blood solids an increase in body temperature occurs; and also at times that there is a decrease of the solids, which shows that the

heat regulating mechanism has drawn water from the tissues in its endeavor to keep down the body temperature. Inorganic solids also show an increase as the exposure progresses.

4. *Blood nitrogen*.—As a means of showing changes in metabolism with the progress of fatigue the total nitrogen as well as the non-protein nitrogen of the blood has been studied. Thus far the studies point to an increase in the total nitrogen if the exposure produces any marked indication of fatigue in the subject.

5. *Blood sugar*.—Because of the importance of carbohydrates in muscular effort the concentration of blood sugar during the period of exposure is being determined. As a general rule the sugar content shows a decided drop in concentration, but if the body temperature tends to increase the sugar content may increase again, indicating an increase in metabolism.

6. *Chlorides*.—Studies have been made of the chlorides of the blood, and a greater increase is noted during exposure.

7. *Determinations of body weight and temperature*.—These are determined at intervals during the exposure. It has been noted that the subject does not seem to suffer from the exposure when a moderate loss of weight is experienced, but as the loss in weight increases, since the blood becomes more concentrated, the body temperature rises, indicating that the water reserve of the body has been drawn on to an excessive amount, and unless the subject is removed from exposure the body temperature may rise to the danger point.

8. *Heart in fatigue*.—Electrocardiograms are made before and after exposure, but this work has not progressed sufficiently for any statement to be made other than that the T wave seems to be flattened out or to become inverted from fatigue.

Lactic acid determinations were made with a view of determining the relation of lactic acid to exercise, and the results thus far obtained tend to show an increase of this acid in the blood during periods of extreme exercise. A modified method, comprising a modification of the Ryffel and the iodine method, for determination of lactic acid in the blood, which has proved to be accurate, was worked out during the course of the experiments.

B. OCCUPATIONAL DERMATOSES.

The report of the investigation made in June, 1921, into the causation of dermatoses among machinists and others using oils and compounds is now in press.

During the course of an investigation in a zinc oxide manufacturing plant of the effects of inhaling zinc oxide dust it was observed that the employees were frequently troubled with a skin affection or dermatosis. Seventeen workers who were exposed to the oxide dust were examined, 14 of whom gave a history of having or having had attacks of "oxide pox." Of this group 7 were suffering from the affection at the time of investigation.

The dermatosis was found to be due to a clogging of the sebaceous glands with zinc oxide, and, secondarily, to infection. Recommendations for prevention of this skin affection were made. A report of this investigation is given in Reprint from the Public Health Reports, No. 705.

C. DUST STUDIES IN A CEMENT AND LIME MANUFACTURING PLANT.

Recently a study of the possible health hazards in a certain cement and lime manufacturing plant was begun and physical examinations were made of over 200 workers, X-ray examinations being made in a number of cases where there was exposure to dust for a considerable period of time. It is planned to have this study extend over a period of several years, during which time absenteeism records of all employees will be kept and physical examinations will be made of all new employees, with subsequent periodical physical examinations. X-rays will also be made of all new employees who previously have not been exposed at any time to a dust hazard, these cases to be followed up by subsequent examinations.

The dusts to which employees are exposed in every division of the cement industry are being studied with regard to chemical composition and to amount and character (size, shape, etc.) of the dust particles. Incidentally, a survey of the home environment of the workers has been completed, including a record made of all previous illnesses in the families. Provision has also been made for visits by a nurse assigned to this work.

III. INVESTIGATIONS CONCERNING ARTIFICIAL AND NATURAL VENTILATION OF VESSELS FOLLOWING FUMIGATION BY HYDROCYANIC ACID GAS AND OTHER GASES.

In March, 1922, a board was convened by the Surgeon General to investigate methods of artificial ventilation of vessels subsequent to fumigation by cyanide gas, and to make studies concerning the utilization of gases other than hydrocyanic acid gas for the purpose of fumigating vessels.

The studies undertaken have been separated into two main divisions:

1. The development of a gas which will approach hydrocyanic acid gas in efficiency, especially in the destruction of rodents, and which will give warning of its presence, even in sublethal amounts, by lachrymation.

2. The study of the natural and artificial ventilation of ships, under varying conditions of temperature, humidity, and wind velocity.

The first division of the work has been carried on at the Edgewood Arsenal, Edgewood, Md., in cooperation with the Chemical Warfare Service; and, after a series of laboratory experiments in regard to the method of producing the gas, the effect of the gas on insects and rodents as compared to cyanide gas, its lachrymatory properties in lethal and various sublethal doses, its condensation properties in cold, its permeability, its absorption by foodstuffs, its explosive properties, etc., it is believed that a gas has been found that meets requirements. This section of the work has been completed and a report is in course of preparation.

The second division of the work is being carried on in cooperation with the United States Shipping Board. One of the large Shipping Board vessels, of approximately 3,500 net tons, has been temporarily transferred to the service, and the ventilation experiments are being conducted under actual conditions on board the vessel.

IV. STUDY OF CAUSES OF INDUSTRIAL ABSENTEEISM.

A study of the cause of absenteeism among employees in the Public Health Service who are stationed in Washington was begun during the past year with a view of determining through interpretation of records the percentage of absenteeism due to sickness and other causes. The records will be collected for a sufficient period of time, so that they may be utilized for the purpose of comparison with absenteeism records being collected among employees in industrial plants.

V. RECORDS OF DISABILITY IN HAZARDOUS OCCUPATIONS.

During the latter part of the year arrangements were made whereby in cooperation with the statistical office, disability records are being kept by several industrial plants in certain of their departments or occupations which are known to be or suspected of being hazardous to the health of the employees, and this work will be extended to other industrial plants from time to time. Records are kept in regard to absence on account of illness, diagnosis being made in the majority of cases by plant physicians. Similar records are also kept for a so-called "control group" in the plant, the employees not being exposed to any specific health hazard in their work, in order to provide for making comparison with the records obtained among the groups of employees who are engaged in hazardous occupations. Thus far such records are being kept in a paper mill, a cement-manufacturing plant, a glass-bottle factory, and a soap-manufacturing plant.

VI. COOPERATION WITH GOVERNMENT DEPARTMENTS.

A. POST OFFICE DEPARTMENT.

In the latter part of the year at the request of the Post Office Department examinations were made of approximately 1,000 employees in the New York and Chicago general post offices for the purpose of determining the physical fitness of the employees, the number being equally divided between the two post offices.

During the latter part of the year an intensive study was made of the illumination prevailing at the general and city hall post offices at New York City, including an investigation of the eye defects present among the workers, and a study of the processes involved in the work of the post office. The cooperation of leading manufacturers of electric lamps and lighting units was solicited in order that all phases of illumination might be taken into consideration. Careful investigation of the brightness of the various units was made, and certain general principles as to permissible brightness were established. Elaborate tests were made over a period of approximately three months to determine the illumination under which the employees work most efficiently and rapidly. The employees observed in the tests were divided into three groups, according to eyesight; namely, normal, subnormal, and very subnormal. The tests were conducted under illuminations of approximately 3, 5, 10, and 14 foot candles, each test extending over a period of about 10 days. It was found that for workers having normal eyesight the maximum

illumination ranged between 8 and 10 foot candles. The object of the survey was not only to determine the proper illumination for the work in these particular post offices, but also to determine the best intensity of illumination for post-office work in general and to draw conclusions as to the best means of lighting for the various processes and operations involved. The report of this survey is now in course of preparation.

Following the illumination studies in the post office at New York and the physical examination of the post-office employees in New York and Chicago, an officer of the service was detailed to act as liaison officer between the welfare director of the Post Office Department and the service.

First-aid boxes have been sent to all post offices where more than 25 persons are employed. The majority of the material that was used in these first-aid kits was surplus material from the hospital division of the service. A certain amount of surplus material for this work was also obtained from the Medical Department of the United States Army.

Studies are being made to determine whether it is feasible to devise a bag that is more satisfactory for letter carriers than the one used at present.

B. COOPERATION WITH THE UNITED STATES BUREAU OF STANDARDS.

At the request of the Director of the Bureau of Standards studies have been made of the physical condition and of the blood picture of persons employed in the radium section of the Bureau of Standards and who are exposed to radiation. A survey was made of the actual working conditions surrounding those who handle radium. Suggestions as to protection against radiation by lead screens and other means were also submitted.

Complete physical and blood examinations of those who are exposed to radiation have been made at regular intervals. The blood pressures have also been studied. Following the use of screens in handling the radium, there has been a general trend toward improvement of the blood pressure of the radium workers. However, the work is of such nature as to eliminate the possibility of entirely protecting the workers from all radiation. A decrease in certain forms of the white blood cells, relatively high haemoglobin content, and low blood pressure are among the things noted in those who are exposed to radiation. The blood pressure in one or two instances was markedly below the usually accepted figure.

Dental films attached to various parts of the body have been used to detect radiation received, and a number of these films that were worn on the forehead and neck were shown to be positive for radiation. These studies will be continued over a longer period of time.

The service has recently undertaken a study of the possibility of metallic poisoning among employees of the Bureau of Standards who are engaged in research work on metal spraying.

C. BUREAU OF MINES.

The work incident to the cooperative arrangement with the United States Bureau of Mines, whereby Passed Asst. Surg. R. R. Sayers

was detailed upon request to serve as chief surgeon to that bureau, was continued throughout the year.

Observations and experiments on the effects of carbon monoxide on the human system were continued, and a report ¹ was published giving a brief account of the effects of the gas, the symptoms that resulted from breathing it, and the methods of treatment.

Experiments in connection with the effect of long exposure in low concentrations under normal air conditions with subjects at rest and subjects exercising strenuously, and of exposure to high temperatures and high humidities in low concentrations, were carried on in a specially constructed gas-tight chamber under accurately controlled conditions at the Pittsburgh Experimental Station, and a report ² of this investigation was published.

A study was made of the effect of comparatively low concentrations of carbon monoxide for short periods and under normal air conditions of temperature and humidity with the subject at rest, and a report ³ was made on the work conducted. It was recommended to the New York and New Jersey tunnel commissions that if the New York-New Jersey vehicular tunnel were so ventilated that persons passing through the tunnel would be exposed to not more than 4 parts of carbon monoxide in 10,000 parts of air for not longer than 45 minutes no ill effects would be experienced.

A paper ⁴ was also written on a method for quantitative determination of carbon monoxide in the blood.

Experiments on the effects of breathing carbon dioxide were also carried out at the Pittsburgh Experimental Station. Conclusions were drawn to the effect that while it is possible to breath 9 to 10 parts of carbon dioxide in oxygen, any percentage above 5 will cause noticeable effects, and between 2 and $2\frac{1}{2}$ per cent is all that should be permitted in the expired air of an oxygen-breathing apparatus at any time.

A detailed study of dust and ventilation conditions was made in one of the mines in Nevada. Complete physical examinations of the workers were made before they entered the mine, several times underground, and again on arrival at the surface at the close of the day's work. X-ray examinations of the chest were made in many cases. A report of the results of this investigation is now in course of preparation.

A report ⁵ on the investigation of lead poisoning in the mines of Utah was prepared during the early part of the year. In this survey it was found that the case rate from lead poisoning in Utah is so far out of proportion to the death rate that the death rate can not be taken as an index to the number of cases prevalent. From reports received during the investigation, the metal mining industry, as represented by the metal mines and smelters, is responsible for at least 95 per cent of the industrial lead poisoning in Utah. However, this was to be expected, since mining and smelting are among the principal

¹ The Treatment of Carbon Monoxide Poisoning: Reprint No. 728, Public Health Reports, Feb. 10, 1922.

² Physiological Effects of Exposure to Low Concentrations of Carbon Monoxide: Public Health Reports, May 12, 1922.

³ Physiological Effects of Exposure to Low Concentrations of Carbon Monoxide: Reports of Investigations, Bureau of Mines, March, 1922.

⁴ The Tannic Acid Method for the Quantitative Determination of Carbon Monoxide in the Blood: Reports of Investigations, Bureau of Mines, May, 1922.

⁵ Relation of Lead Poisoning in Utah to Mining: Reports of Investigations, Bureau of Mines, August, 1921.

industries of the State with relatively few other industries in which workers might be exposed to lead salts. The principal controlling factors in lead poisoning in mining are the nature of the lead ores mined, the dryness of the mine, dust in the atmosphere, and ventilation. The carbonate and oxide ores are much more likely to cause lead poisoning than sulphide ores; consequently, although a mine may produce a considerable output of lead, if the relative proportions of carbonates and oxides to sulphides are low, there will be fewer resulting cases of lead poisoning.

In connection with the preparation of the bulletin on the metallurgy of quicksilver, soon to be issued by the Bureau of Mines, certain material was prepared for use as a chapter on the health hazards in mercury mines and in mercury reduction works. A statement relative to mercury poisoning and preventive measures to be instituted appeared in the Reports of Investigations, Bureau of Mines, May, 1922, serial No. 2354.

The physiological effects that result from wearing mine rescue apparatus were considered in a paper presented to the conference on standardization of mine rescue apparatus held during the International First Aid and Mine Rescue Meet, at St. Louis, in September, 1921.

During the close of the year an investigation was undertaken by the United States Bureau of Mines, in cooperation with the American Petroleum Institute and the Public Health Service, for the purpose of ascertaining the health hazards in the petroleum industry, especially in connection with vapors and gases resulting from refining of crude oils having a high sulphur content.

As to the tunnel-gas investigation, a model tunnel was constructed at the Bureau of Mines experimental mine at Bruceton, Pa. The exhausting gases from automobiles operated in the tunnel and the supply of air to the tunnel were so regulated that the air would contain as nearly as possible 0.04 per cent carbon monoxide. The physiological effects of changes were observed in men standing or driving automobiles in the model tunnel under varied types of ventilation. A report, with recommendations, is now in course of preparation.

Passed Assistant Surgeon Sayers, as chairman of the subcommittee on prevention of illness among miners, of the American Institute of Mining and Metallurgical Engineers, prepared a summary of the work done during the past two years by the Bureau of Mines and other agencies for the improvement of health and the prevention of illness among miners, calling particular attention to some of the more outstanding investigations in which progress has been made, such as those on the physiological effects of carbon monoxide, carbon dioxide, dust and ventilation, and temperature and humidity.

Sanitary surveys were made of a number of mining camps in Kentucky, Missouri, Utah, Nevada, and California, and some interesting points were taken up in a report⁶ on the planning and developing of oil-shale camps. This data appeared in a report, "Prevention of Illness among Miners," Report of Investigations, Bureau of Mines, February, 1922.

The Miners' Safety and Health Almanac for the calendar year 1922 was prepared by Passed Asst. Surg. R. C. Williams, and is the fourth

⁶ Sanitation in Planning and Developing Oil-Shale Camps. Reports of Investigations, Bureau of Mines, July, 1921.

of a series published by the Bureau of Mines for the purpose of enlisting the cooperation of miners in improving health conditions and decreasing accidents in the mining industry.

A safety and health campaign was carried on in the mining camps of Utah and the results were so satisfactory that these campaigns are being extended to other sections. This work is done in conjunction with training in first aid and instruction in health and safety by means of lectures, moving pictures, slides, bulletins, and personal talks.

An investigation is now in progress to ascertain the causes of death among miners in the principal mining districts of the United States for the purpose of determining the diseases and types of accidents which are most prevalent among this class of industrial workers.

VII. COOPERATION WITH INDUSTRIAL AND OTHER AGENCIES.

A. WITH THE AMERICAN INSTITUTE OF BAKING.

During the latter part of the year, at the request of the American Institute of Baking, an officer was detailed to assist in the development of an inspection service to be maintained by the American Bakers' Association. Arrangements are now being made for the enlistment of the cooperation of the various members of the American Bakers' Association for the purpose of conducting a study of absenteeism in their plants, the work in question to be conducted through cooperation with already existing State organizations.

B. CONSULTING SERVICE.

In the course of the year in response to numerous requests for information, advice was given to industrial establishments, industrial workers, various State and municipal boards of health, public health and welfare associations, privately operated industrial health bureaus, and Government departments and offices on matters relating to industrial hygiene.

C. WITH THE AMERICAN ENGINEERING STANDARDS COMMITTEE.

Cooperating with the American Engineering Standards Committee the service, as sponsor for the preparation of an industrial sanitation code, has made progress toward the formulation of the code.

Service officers have been detailed to sectional committees at the request of the respective sponsors to assist in the formulation of the following named codes: Industrial lighting code; ventilation code; gas safety code; national safety code for the protection of the head and eyes of industrial workers; foundry safety code; safety code for the use of grinding wheels.

PUBLIC HEALTH ADMINISTRATION.

NORTH DAKOTA.

During the year a preliminary study was made by Surg. R. Olesen of the Public Health Administration of North Dakota. This survey was conducted at the request of the health authorities of that State

and resulted in findings upon which recommendations were made which it is believed will lead to great improvement in the organization of the health activities of North Dakota. A reorganization of the State board of health, with augmented funds and personnel, is an urgent need.

NEW BRUNSWICK, N. J.

In response to a request from the State health department a survey of the local health administration in the city of New Brunswick was made under the direction of Passed Asst. Surg. R. E. Dyer, of the service, acting in cooperation with the State health authorities. The report of observations contains briefly the following information:

The present local health department is inadequate to afford a reasonable degree of health protection to the community. The most important deficiency is the lack of a full-time trained health officer as the responsible head of the department and the employment of unlicensed inspectors and their assignment to work for which they are not qualified by training and experience.

It was recommended that the health department of New Brunswick be reorganized along certain lines indicated in the report and that the appropriation for the support of the health department be increased.

HOT SPRINGS, ARK.

In September, 1921, upon request of the State health authorities, a survey was made by Passed Asst. Surg. C. Armstrong, of Hot Springs, Ark., including an investigation of every condition affecting the health of that city and of the organization of the health department of the city government. In view of the fact that this city is a health resort and is visited annually by approximately 150,000 persons, this investigation was important. Recommendations were made for improvements in a number of instances, but the greatest emphasis was laid upon the importance of appointing a full-time health officer at a salary sufficient to attract a man having adequate public health training.

WASHINGTON COUNTY, MD.

(See also p. 45).

At the request of the State health officer of Maryland, Asst. Surg. R. B. Norment, jr., was detailed to Hagerstown, Md., to direct the organization and operation of the Washington County public health demonstration. This project is conducted by the State Board of Health of Maryland in cooperation with the United States Public Health Service, the International Health Board, the School of Hygiene and Public Health of the Johns Hopkins University, and the Washington County Public Health Association.

The objects of the project are as follows: (1) Organization of effective public health administration in a rural area; (2) conduct of field studies and research in rural hygiene; (3) establishment of a demonstration area where actual field practice in investigation, organization, and administration could be shown to students of the School of Hygiene and Public Health of the Johns Hopkins University, and other persons authorized by the cooperating agencies.

The work of the demonstration may be classified as follows: 1, Nursing service. 2, Clinic service. 3, Laboratory service. 4, Child hygiene, (a) school medical inspection; (b) study of causes of absence of school children; (c) school milk classes; (d) nutrition classes; (e) prenatal, maternity, and postnatal care. 5, Field investigations, (a) epidemiology; (b) morbidity study; (c) industrial hygiene. 6, Administration.

The State health officer has final decision in the general policies and administration of the demonstration. The director is responsible for local administration, under authority granted by the State board of health.

COOPERATION WITH JOHNS HOPKINS UNIVERSITY.

Surg. W. H. Frost continued in charge of the department of epidemiology in the Johns Hopkins School of Hygiene and Public Health, to which he was detailed by the service in response to the request of the Johns Hopkins University authorities.

CHILD HYGIENE.

Field investigations in child hygiene have been made in eight States and the District of Columbia during the past fiscal year. Although of research nature, these investigations have served to stimulate State-wide interest in and support of the work of the constituted health authorities promoting and protecting maternal and infant health and life. In a number of instances concrete local results have been obtained as a result of these investigations, such as the establishment of child health centers, local provision of facilities for the dental care of necessitous school children, extended public health nursing service, and more intensive school health supervision. These results have been largely due to the fact that in order to obtain material for study in connection with the solution of special child health problems, the service has been obliged, in a number of instances, to carry on routine work. Especially has this been true with the research which the service is making in the schools relating to standards of physical development. The improvement in school health supervision consequent on these studies has been marked, notably from the standpoint of improved nursing service, better cooperation by the local physicians, and greater attention to nutritional problems manifested by the establishment of special classes in nutrition.

The work of the mouth hygiene unit among school children has been notable. During the fiscal year special attention has been given to the study of the effect of septic mouth conditions on school progress and the relationship of oral sepsis and dental caries to student growth and development. The results of these investigations will be made the subject of a special report.

CHILD HYGIENE IN FLORIDA.

In response to a joint request from the Florida State Board of Health and the Florida Federation of Women's Clubs, service officers were detailed to that State, in October, 1921, to study local conditions influencing child morbidity and mortality, to assist the State health

authorities in their efforts to combat these conditions, to make anthropometric studies of school children relative to growth and development, and to make special investigations of the effect of physical defect and endemic diseases on growth and development and their relation to school progress.

The work was planned to include intensive studies in two counties by child hygiene units, investigations by the oral hygiene unit, nursing service, and nutrition work, all of which was under the supervision of the medical officer in charge. Orange and Pinellas Counties were selected for special demonstrations in child hygiene because they were believed to be representative of the sections in which they were located.

Orange County child hygiene unit.—The Orange County unit consisted of a service officer, a nurse, and a microscopist. The unit was able to enlist the interest and cooperation of the county superintendent of schools, the city superintendent of schools, the nurses, the county social service worker, the women's clubs, and the American Legion Auxiliary. Rooms in one of the city school buildings were set aside for their use, and transportation to rural schools was furnished by the Women's Club.

The service nutrition worker conducted conferences with mothers in regard to nutrition, and organized nutrition classes in six schools, three urban and three rural. Each of these resulted in a decided gain in nearly every child.

The oral hygiene unit made a complete dental survey of all school children in the county. The results of this survey will be correlated with other data collected by the Orange County unit in a study of the effect of certain defects and diseases on the growth and development of children. In the course of this survey in Orlando, the county seat, the local dentists contributed their services to the establishment of a free clinic for one afternoon each month, each dentist working in his own office and making all necessary corrections for children whose parents could not afford to pay. This has become a permanent clinic, and purposes to care for an average of 75 children a week.

The classroom health score forms designed by the service were found to be very useful for securing the correction of hampering physical defects. Children competed with one another for the gold star placed after the names of every child attaining a minimum health standard.

A total of 4,001 children were examined in the schools of Orange County. These children, of which 2,867 were white and 1,134 colored, were enrolled in 42 schools, 29 white and 13 colored.

Much material was collected for the study of the effect of hookworm infection on growth, and 2,046 examinations for hookworm were made, of which number 19 per cent were found to be positive. The percentage of hookworm disease in the rural schools was much higher, being 30 per cent as compared to 10 per cent in the city. The percentage in colored children was only 8.3 per cent as compared with 22.9 per cent in the white.

In the matter of vaccination for smallpox, 51 per cent of the colored children were vaccinated, and only 27.5 per cent of the white children. Vaccination of school children is not compulsory in Florida.

In the course of special investigations and in cooperation with the women's clubs, the Anti-Tuberculosis Society, and one of the local druggists, a child health center was opened in Orlando. This will be made permanent by the joint action of the Orange County Medical Society, the County Federation of Women's Clubs, and local nurses. A total of 139 infants and children of preschool age were enrolled.

The Medical Society is also making an effort to arrange for the medical inspection of school children, and is advocating the employment of a full-time health officer.

Pinellas County child hygiene unit.—In Pinellas County the work of the United States Public Health Service Unit was largely confined to the schools.

During the period from November, 1921, to June, 1922, 5,174 school children, 41 infants, and 40 teachers were weighed, measured, and given physical examination.

Of 1,758 children in 18 schools examined for hookworm, 240, or 13.6 per cent, were found positive. The highest rate of hookworm infection was 52.6 per cent and the lowest 9 per cent, with an average of 19.3 per cent. The highest rate of infection was observed in children in strictly rural districts or from unsewered sections of urban communities. Educational bulletins and personal letters were sent to the families of these infected children.

In a comparison of figures giving the "age grade" of children from the first to the eighth grade, children infected with hookworm were found to be approximately one year behind those free from infection, and children with physical defects were approximately one-fourth year behind those without gross defects.

In the spring 2,900 children were reinspected, in order to obtain some idea of the amount of corrective work resulting from the special work of the service. In two schools having 194 pupils and an aggregate of 404 physical defects, 34.4 per cent of these defects had been corrected. In one school the number of children with perfect health scores (given to those who had attained a prescribed minimum health standard) had increased from 6.4 per cent in February to 22.1 per cent in May. In another a perfect health score of 11.1 per cent in early March had been raised to 25.7 per cent in May.

In one of the St. Petersburg schools 67.2 per cent of the children who were below normal weight in February had been brought up to normal in May, the increased weight being due to a well-managed milk-drinking campaign in the school, and greater attention to the health of the children by both the parents and the authorities brought about largely by these studies.

Articles were written for the local papers, addresses given before various organizations, and personal letters addressed to parents of children with defects needing medical, surgical, or dental attention. In addition, one clinic was held to demonstrate the measures to be employed for the control of impetigo contagiosa in schools, and a class for the care of granulated eyelids was conducted at one of the schools during April and May.

As a part of the extensive study planned by the service in an effort to establish more accurate standards of physical development, 556 children were given the special measurements required for this study.

The Pinellas County Federation of Women's Clubs provided a Ford touring car for transportation, the county commissioners gave office space in the county courthouse, and the State board of health furnished the laboratory and some office supplies.

Through the courtesy of the city health officer of Tampa, arrangements were made whereby all eye and ear cases, who can not afford to pay private fees, will be treated at a nominal cost.

The work of the Pinellas County unit resulted in a pledge of the county commissioners to employ a second full-time nurse to assist in putting into effect the school hygiene program recommended by the service. In addition, a committee of three physicians was appointed to serve in an advisory capacity in connection with this program, and arrangements made for special treatment of indigent children in clinics to be operated at convenient points within the county.

The special field of nursing activity was the northwest section of Florida, particularly the nine western counties. With the co-operation of local physicians, representatives of the State home demonstration department, and the district health officer for western Florida, the children in five representative schools in Escambia, Santa Rosa, and Washington Counties were carefully examined, and nutrition classes were developed in several schools. A "baby week" clinic was held in Pensacola with an average daily attendance of 100 children. At the close of the fiscal year a series of infant and pre-school age child clinics were scheduled for 11 points in Escambia County.

The studies undertaken in Florida, which included the examination of over 10,000 children, show the great and general need for and the beneficial effect of organized effort for the promotion of child health.

CHILD HYGIENE IN BEDFORD, IND.

At the request of the Bedford school physician, indorsed by the Indiana State Board of Health, an officer of the service was detailed in November, 1921, to make a survey of health conditions in the Bedford, Ind., schools.

There are five schools and approximately 2,300 pupils in the city of Bedford. The child hygiene investigations in that city fell under the following main divisions:

1. A health survey of the pupils, and a study of their health supervision, including a survey of general hygienic conditions in the schools.
2. A comprehensive health program carried out under the direction of the service officer.
3. Nutrition studies.

The program included (1) medical inspection, (2) nursing and follow-up service, (3) nutrition work, (4) a dental survey, (5) the Schick test, (6) the correlation of health work with art and English, and (7) the preparation of a course in health education to be introduced into the curriculum at the next school session.

In addition to the common physical defects found in every school population, the survey called attention to three facts of public health significance—the larger number of children unprotected from small-pox by vaccination, the high percentage of simple goiter, and the presence of trachoma among the pupils.

Vaccination is not required by law in Bedford, and outbreaks of smallpox are not uncommon. In the three elementary schools 3.1 per cent of the 1,166 children examined showed no successful vaccination. Even in the high school, of 374 pupils whose vaccination record was clear, 46.7 per cent had made no attempt to obtain a successful vaccination. Under circumstances such as these a very large part of the population of Bedford is a distinct menace to the health of its own community and the country at large.

Of 216 girls examined in the senior high school, 41.2 per cent showed an enlargement of the thyroid gland. In the junior high school, practically the same percentage of 249 girls were goitrous. In the latter school the range of age was from 10 to 16 years. Enlargement of the thyroid gland was noted in one of the elementary schools in a girl 6 years of age.

In four of the schools 391 children took the milk lunch for a greater or less period of time. This number comprised about 21 per cent of the enrollment and 60 per cent of the number of underweight children. During the school year the percentage of underweight children in these schools was reduced from 39.1 per cent in the fall to 21.9 per cent in the spring.

A small number of these underweight children were specially instructed in a nutrition class.

Very largely due to the stimulus of the service activities seven local practicing dentists gave the time necessary to inspect the mouths of the whole school population. The records of their findings were sent to the parents.

During the course of this survey the service officer in charge undertook and carried to completion original studies in two phases of the nutrition problem. These deal with the relation of nutrition to the posture of school children and with the relation of school life and educational acceleration to the pupil's nutrition.

CHILD HYGIENE IN HAGERSTOWN, MD.

Advantage was taken of the opportunity offered by service cooperation with the Maryland State Board of Health, the International Health Board, the Johns Hopkins University School of Hygiene and Public Health, and the Washington County Public Health Association in the work of the Washington County health demonstration to make certain child-hygiene investigations in that locality. These investigations were begun in November, 1921, and consisted in part in measurements and physical examinations of school children, studies in nutritional problems relating to school children, and a limited amount of oral hygiene. The child-hygiene work in this community was correlated with that of the statistical office of the service in a study of morbidity and methods of morbidity reporting.

By reason of the limited personnel available for this duty the studies in school hygiene were restricted to the children of the first and second grades in nine public schools. A total of 1,777 children were examined, and special anthropometric measurements were made. These studies are not yet completed. However, it is of interest to note that the percentage of children underweight, determined by comparison with available standards, varies in the different schools of the city from 25 to 31 per cent of those examined. Of 60 children

retarded in school work, who attended the Winter Street School, 30 per cent were underweight.

Of 332 children examined in another school 3.9 per cent were found to have some cardiac damage, an unusually high percentage of this form of physical defect.

In another school, the room occupied by the first and second grades is badly lighted, and 54 per cent of the children examined were found to show visual defect.

Although these investigations have been in operation only a comparatively limited time, the effect of them has been to stimulate popular interest in school-health supervision.

The special measurements and the results of the physical examinations made in this district are intended for use in connection with the attempt of the Public Health Service to secure more accurate standards of physical development.

ORAL HYGIENE.

Mississippi.—The beginning of the fiscal year found the dental unit in the State of Mississippi, where it conducted investigations in mouth hygiene in cooperation with the State health and educational authorities. These studies were made in the summer normal schools. The number of teachers attending the summer session at these normal schools varied from two to eight hundred. Clinics and lectures were given by the unit at each school whenever possible. These investigations have served to arouse the interest of teachers in school-health problems and have been of educational value in training them in the measures and methods employed to solve them.

Florida.—In Florida the dental unit assisted the child-hygiene investigations in that State by visiting large centers for the purpose of conducting mouth surveys of school children. A total of 69 schools in 56 communities were visited, and 8,025 mouths were examined.

In 3,654 mouths examined outside of Orange County, including the work in Pinellas County, 1,434 defective first molars were found, showing that in this State, as elsewhere, there is a very general tendency for parents to neglect this most important tooth. In this group there were also 1,194 cases of malocclusion, 784 cases of gum infection, 9,620 cases of caries, and 5,627 fillings. The mouth conditions in these 3,654 Florida children as compared with those of children in other States are shown by the following table:

	Percent- age of caries.	Children with first molars missing or defec- tive.	Maloc- clusion.	Infected gums.	Fillings.	Total exam- ined.
Florida.....	2.12	0.38	0.33	0.21	1.54	3,654
Delaware.....	1.99	.65	.36	.22	1.48	1,435
Tennessee.....	2.22	.48	.38	.26	.85	6,036
Huntington, W. Va.....	3.16	.55	.38	.16	.62	500

Of 168 eighth-grade pupils, 56 per cent of those with gum infection were underweight, while only 34.5 per cent of those without gingival infection were below the usual standard of weight.

Among 1,000 children, 325 were found to have no defect other than those of the mouth. In this group those with a mouth rating of 70 per cent averaged 75.8 per cent in scholarship, those with 80 per cent mouth rating averaged 82 per cent in scholarship, and those whose mouths received a rating of 90 per cent averaged 87.5 per cent in scholarship, according to the school record.

The material collected in Orange County in the case of approximately 4,000 school children has not yet been compiled. This will be used in connection with studies on the effect of physical defect on growth and development.

The unit was aided materially in the work done in Florida by the cooperation of the health officers, the Federation of Women's Clubs, and local dentists.

Maryland.—The hygienist of the dental unit was detailed to Hagerstown, Md., shortly before the close of the fiscal year. In the period between May 17 and June 23, 1922, 599 mouths were examined and a number of lectures on oral hygiene were given.

CHILD HYGIENE IN MISSOURI.

The child-hygiene work carried on in the State of Missouri in cooperation with the State department of health during the previous fiscal year was reduced to a minimum during the year. It has consisted largely in studies of community needs and methods of securing community provision of adequate child health supervision.

In the course of these investigations there has been found a very serious infiltration of trachoma infection in the school population of southeastern Missouri. Of 222 public-school children examined in one country, 117, or 52.25 per cent, were found to have some form of conjunctivitis. As a result, the State department of health and local communities are taking steps to carry out effective control measures.

CHILD HYGIENE IN MEMPHIS, TENN.

At the request of the health officer of the city of Memphis, an officer of the service was detailed to that city on April 8, 1922, to make special investigations in the physical development of children of school age. In the conduct of these investigations instructions were given to the nurses in the employ of the Memphis health department in order that, in the future, the measurements of school children might be taken with a greater degree of accuracy.

The special investigations conducted in Memphis were a part of the studies the service proposed to make of the normal physical development of children. Of 1,014 children measured, 576 were white children and 438 were colored children.

CHILD HYGIENE IN UTAH.

In response to a request from the Utah State Board of Health an officer of the service was detailed to that State on July 1, 1921, for the purpose of undertaking studies in child hygiene and tuberculosis in cooperation with State and local authorities and other health agencies.

A study of conditions led to the conclusion that the requirements of the situation would be best met by a tour of the State to obtain data relative to maternal and infant mortality and to study conditions involving the mortality rate: to make investigations and secure proper standards for health supervision of infants and children of pre-school age; to establish permanent clinics or health centers to be operated at local expense; and to stimulate the citizens generally to activity in the line of the correction of physical defects in childhood, the provision of public health nursing service, and the needed facilities for taking care of child health problems, including popular support of the establishment of a division of child hygiene in the State board of health.

To serve these purposes, and also that of a tuberculosis survey, a traveling clinic through the financial assistance of the Utah Public Health Association, which is the State tuberculosis association, was placed in the field. This clinic consisted of two divisions, one for tuberculosis and one for child hygiene, and was operated under the direction of a service officer. The Utah Public Health Association not only equipped the traveling clinic but also furnished an educational director and, from time to time, five nurses. In various communities local physicians and lay workers have been of great assistance.

At the close of the fiscal year the traveling clinic had visited 19 counties and 51 child-hygiene clinics had been held in 54 towns. The special lectures given at over 200 public health meetings were attended by a total of 45,697 persons.

Motion pictures and slides illustrating health subjects were shown 113 times. Editorials and special articles were supplied to local newspapers, and much health literature was distributed.

The traveling clinic aroused great interest, and at Ogden this interest led to the reorganization of a children's clinic previously established. The clinic has been enlarged, dental equipment installed, and the services of a pediatrician secured for duty twice a week. The clinic is now well attended. Similar conditions existed at Provo, where a well-equipped clinic had been little patronized by children. The work of the service led to the employment of a well-trained public-health nurse, and the clinic is now well patronized by the community.

Though the primary function of the child hygiene division of the traveling clinic was to investigate conditions among infants and children of the preschool age, the interest of schoolmen led to many school children being brought to the clinic for examination. On request of the county superintendents of schools for school medical inspection, special school-hygiene studies were made in Summit and Davis Counties in cooperation with the department of education and the local superintendent of schools.

At the White Rocks school for Indian children an examination was made at the request of the commissioner of the reservation. Among the 82 children examined there were 41 cases of trachoma. It should be noted, however, that trachoma is not confined to the Indian children, sporadic cases of the disease being found throughout the Uinta Basin. In some of the towns in this vast territory there is no medical aid to be had except from physicians who live at great distances. There is only one nurse in the entire basin.

One of the striking discoveries made in the course of this survey was the very high percentage of cardiac damage found in the children in this district, over 5 per cent. Associated with the marked incidence of cardiac damage is an exceptionally high percentage of underweight, much tonsillar infection, and acute rheumatism. The survey of the Uinta Basin has emphasized the inadequacy of medical service in rural districts.

Every one of the Indian children examined had been vaccinated. Unfortunately this is not the case with the white children. Of 4,125 children examined for evidence of previous vaccination, it was found that 3,078, or 75 per cent, were unvaccinated.

Of 1,590 children weighed in eight rural schools in two counties, 587, or 36.9 per cent, were found to be 7 per cent or more underweight by Wood's standard.

Of 952 infants weighed, 40 per cent were found to be underweight, and 29 per cent of 1,152 preschool children. It is interesting to note that 40 per cent of 1,087 infants and 30 per cent of 984 preschool children examined habitually had insufficient sleep.

Of 4,613 school children weighed, 2,191, or 47 per cent, were 7 per cent or more underweight. In some of the schools of Sanpete County the rate of underweight ran as high as 71 per cent.

The State board of health and the Utah Public Health Association were assisted by the service personnel in putting on an exhibit of child-hygiene activities at the State fair. At this exhibit over 1,000 children were weighed and measured and instructions given to mothers regarding health matters.

MISCELLANEOUS CHILD-HYGIENE ACTIVITIES.

Nutrition work.—The various investigations in child hygiene undertaken by the service reveal a considerable amount of undernourishment in the child population. To educate the public in the causes, results, and remedies to be considered in this problem, to demonstrate methods of combating the condition, and to study the relationship of potential causal factors to underweight, special work in nutrition was carried on in connection with the Florida studies in child hygiene, and toward the close of the fiscal year, to a limited degree, at Hagerstown, Md.

A vigorous campaign of public-health education was carried on through conferences and public lectures. Many conferences were held with health officials and other interested persons. Addresses and talks were given before women's clubs, parent-teachers' associations, State teachers' associations, and groups of pupils and teachers.

As one of the results of these studies nutrition classes were organized in Orange County, Fla., which resulted in 100 undernourished children being restored to normal weight. Other classes in this State were organized in the schools, and as an outgrowth of the nutrition work in Plant City a general child-hygiene program was instituted. Our studies tend to confirm the opinion that defective nutrition is essentially a medical problem, and that underweight is a danger signal to be considered in connection with other symptoms in the application of measures for correcting this condition.

District of Columbia.—On the request of the director of the Girl Scouts of the District of Columbia the child-hygiene office has con-

tinued the physical examination of girls and women who registered for attendance at the Girl Scouts' camp which was undertaken during the latter part of the last fiscal year. At the close of the year 264 examinations had been made. Consent has been secured for the return of approximately all of these children for reexamination at the end of the camping-out period in order that an attempt may be made to evaluate the effect of camp life and camp conditions on their general health.

Virginia.—In connection with the rural sanitation work of the service the child hygiene office participated in and helped to organize the child health center work in Arlington County, Va., described in another section of this report (see p. 53.)

Maryland.—On request of the medical officer in charge, the child hygiene office assisted in organizing the child health center work on the Government reservation at Perryville, Md. The child health activities at that point are described in a special article which appeared in the Weekly Public Health Reports May 5, 1922.

In addition, on request of the State commissioner of health, a service representative visited Hyattsville, Md., and assisted in organizing a nutrition class in the grade school of that city.

Special physical measurements.—In order to obtain representative data for use in estimating the growth of children at various age periods according to sex, the cooperation of several State boards of health were secured.

On September 27, 1921, a conference was held in Washington, D. C., with representatives of State bureaus and divisions of child hygiene, to devise plans for cooperation in child hygiene activities, with particular reference to the determination of an acceptable measure of the physical development of children according to sex, age, and racial stock.

Very important physical measurements of children have been made in Georgia and Virginia, in addition to similar data obtained in the States mentioned in the body of this report. This material constitutes a very valuable contribution to the study of the physical development of children, due to the desirability of obtaining data of this character from widely separated sections of the country, representing both rural and urban conditions and recorded in a uniform manner.

Child health educational measures.—In addition to the educational effect of the general child hygiene activities of the service which, in a number of instances, has resulted in community action for the greater protection of child and maternal health and life, the service has written thousands of letters during the year in response to individual inquiries for information. Of special interest in this connection is the testimony of large numbers of expectant mothers throughout the country regarding the value of the health instruction given them in a series of individual monthly letters appropriate to the stage of the pregnancy. The service has distributed during the year approximately 250,000 leaflets and bulletins relating to child and maternal health which were prepared by service officers engaged in child hygiene investigations.

Infant welfare conference.—On invitation of the British National League for Health, Maternity, and Child Welfare, Surg. Taliaferro Clark was detailed to represent the service at the second English-speaking conference on infant welfare held in London, England, July

5 to 7, 1921. The conference was held during the celebration of the national baby week, 1921. A report on this conference was printed in the Public Health Reports October 7, 1921.

In addition to representing the service, Surgeon Clark, on special request, also represented the American Child Hygiene Association and the American Public Health Association.

RURAL HEALTH WORK.

The results of the cooperative rural health work of the Public Health Service in the fiscal year ended June 30, 1922, were entirely in support of the conclusions in the reports of this activity in the fiscal years 1920⁷ and 1921.⁸ Those conclusions were, respectively, as follows:

"Reasonably adequate appropriations for the cooperative activities of the United States Public Health Service in rural health work could be used with a high degree of effectiveness, and in entire consistence with our principles of government, for nation-wide promotion of human health, and would yield to the national welfare a dividend second to no other obtainable from investment of Federal funds."

"The demonstration rural health work of the Public Health Service has succeeded to such a degree that it now should be put on a cooperative basis so that any rural community in the United States ready to do its proper part might receive from the Federal Government due and logical assistance in the development and maintenance of reasonably adequate local health work."

The amounts specifically appropriated by Congress for special studies of and demonstration work in rural sanitation and made available for the cooperative rural health work of the Public Health Service have been as follows:

Fiscal year.	Amount.
1917.....	\$25,000
1918.....	150,000
1919.....	150,000
1920.....	50,000
1921.....	50,000
1922.....	50,000

Before 1911 none of our rural communities was provided with local health service approaching adequacy under the direction of whole-time county or district health officers. At the beginning of the calendar year 1922, about 10 per cent⁹ of our rural population was receiving such service. That is progress, but it is slow.

Due to lack of business-like local health service in our rural communities, scores of thousands of deaths and hundreds of thousands of cases of incapacitating illness occur every year among our people. Many of the halt, the lame, and the blind among us are such because we, as a nation, have not gone into the rural health business in a business-like way. If our Federal Government has a right to cooperate with State and county governments in any work for the promotion of the general welfare, it surely seems to have a right, a solemn duty, and a great opportunity in the rural health field. The plan of

⁷ Page 15, Reprint No. 615, from Public Health Reports, October 1, 1920

⁸ Page 17, Reprint No. 699, from Public Health Reports, October 7, 1921.

⁹ Public Health Reports, vol. 37, No. 29 of July 21, 1922, pp. 1794-1799.

cooperative rural health work in which the Public Health Service has been engaged on a necessarily small scale because of meager appropriations in the last several years was evolved from field experience. It works. Its extension seems advisable.

At the termination of the fiscal year 1921, \$13,754.72, unexpended under contracts made during that year, remained available. This amount, with the \$50,000 appropriated, made \$63,754.72 available for the cooperative rural health work of the Public Health Service in the fiscal year beginning July 1, 1921. Of this sum, \$44,816.04 was expended under allotments for cooperative projects in counties, and \$5,630.26 was expended for administration, supervision of local projects, and special studies of the problem of rural sanitation. The unexpended balance of the total sum available was included in allotments to some of the cooperative projects which, because of various local circumstances, could not be completed by the end of the fiscal year. With the existing difference between the Federal fiscal year and those of some of the States and localities in which the work is done, it would not be practicable, without lessening the degree of economy in administration striven for, to arrange contracts so that the allotment of Federal funds to every project would be expended exactly by the end of the Federal fiscal year.

During the fiscal year 1922, cooperative projects were carried out in 56 counties (or districts comparable to counties) in 16 States. The total expenditure for the support of the local projects was \$406,276.78. Of this sum, an aggregate of \$284,839.85 was provided from State, county, and municipal governmental sources, \$76,620.89 from civic sources, such as local health associations, local Red Cross chapters, and the International Health Board, and \$44,816.04 from the rural sanitation funds of the Public Health Service. Thus this investment of Federal funds was met with odds of over 8 to 1 for the support of the work. The proportion of the expenses covered with funds from local sources is significant. It gives some idea of the stimulating effect of the Federal Government's cooperation and suggests what might be accomplished, without unnecessary and disastrous delay, in this vitally important nation-wide field if Congress would appropriate sufficient funds for the purpose to enable the Federal Government to extend this plan of cooperation in the rural health business to a reasonably adequate degree.

PLAN OF WORK.

The plan of work in the fiscal year 1922 was practically identical with that ¹⁰ carried out in the fiscal year 1921. This plan has proved economical and effective under a wide range of local conditions. No radical change in it appears advisable, but a wide extension of it would seem highly advantageous.

THE CAPE COD PROJECT.

The cooperative health work begun in May, 1921, under the direction of a whole-time district health officer, in 10 of the 14 towns in Cape Cod, Mass.,¹¹ has progressed very satisfactorily. This project is of especial interest in that it furnishes a test of the applicability of

¹⁰ Pages 10-11, Reprint No. 699, from Public Health Reports of Oct. 7, 1921.

¹¹ Pages 11-12, Reprint No. 699, from Public Health Reports of Oct. 7, 1921.

the general plan of cooperative rural health work to the conditions of local government by town units obtaining in Massachusetts and other New England States. After the first year of this experiment, the number of towns in the cape entering into the cooperative project was increased from 10 to 11, and the funds provided by the town governments for the support of the district health department in its second year of activity were increased from \$5,100 to \$6,115. A few months after the active work was begun, the district health department's force was augmented by a health nurse, whose services are provided through the cooperation of local Red Cross chapters.

SPECIAL DEMONSTRATION WORK IN VIRGINIA COUNTIES.

The plan of special demonstration work in rural sanitation which was carried out in Virginia in 11 counties in the fiscal year 1920 and in 10 counties in the fiscal year 1921, was carried out in 14 counties¹² in that State, and in 1 county (Marion) in Alabama, in the fiscal year 1922. This plan, which is described in previous reports,¹³ has proved highly successful. After three years of trial, this plan appears to meet better than could any other plan yet proposed the situations in rural counties in which effective health work, if begun at all, must be begun on a low-cost basis, and in which outdoor sanitary measures, such as control of soil pollution, protection of domestic water supplies, and control of mosquito breeding, are especially indicated in the beginning of the local program of rural health work. Therefore the plan is applicable to many of our rural counties. In a number of instances among the demonstration projects in the Virginia counties, it has been found that, on conservative estimates, the saving in dollars and cents to the county, accomplished by only 1 or 2 of the 15 or 20 items of work carried out by the sanitary officer in the course of a year, amounted to considerably more than the cost of the sanitary officer's services for that year. The services of the sanitary officer, besides having an immediate and readily apparent value, often result in the development of popular sentiment in the county for an enlarged scale of health activities. In each of a number of the Virginia counties, the county appropriation for health service has been increased sufficiently after the first or second year of work by the county sanitary officer to secure the services of a county health nurse or of both a county health nurse and a whole-time county health officer in addition to those of the sanitary officer. Since the inauguration in Virginia (February, 1919) of the plan of sanitary officer demonstration work in rural sanitation, there has been no difficulty in finding in that State counties whose authorities are willing to make appropriations of county money to secure the cooperation of the State board of health and the United States Public Health Service in carrying out the demonstration projects. Whenever the work has been discontinued in one county, one or more counties have been ready with county appropriations to take the place of that county on the cooperative list. If the combined funds of the State and Federal cooperating agencies were adequate to meet as much as two-fifths of the total cost, it is probable that whole-time county health service

¹² Bath, Carroll, Charlotte, Chesterfield, Greensville, Henry, Mathews, Northumberland, Orange, Prince Edward, Pulaski, Richmond, Roanoke, Wythe.

¹³ Pages 10-12, Reprint No. 613, from Public Health Reports of Oct. 1, 1920, and pages 12-14, Reprint No. 699, from Public Health Reports.

could be developed within a short time in a large majority of the counties in the State which are not now provided with such service. An offer from the central health agencies to supervise and financially assist in the support of the work is a potent factor in the persuasion of the average county board of supervisors to make an appropriation for whole-time county health service. Without such cooperation from the State and Federal health agencies, satisfactory progress in county health work is not to be expected in Virginia or in any of the other States. The State health commissioner expects to try to obtain from the next Virginia Legislature a sufficient appropriation for rural sanitation to enable the State board of health to offer due and proportionate cooperation to every county in the State whose authorities desire and will appropriate their proportionate part for whole-time county health service.

GENERAL PROGRESS IN RURAL HEALTH WORK.

Notwithstanding the general financial situation, substantial progress was made in the development of whole-time rural (county) health service in the United States during the fiscal year. According to data¹⁴ collected by the Service from the State health departments, the number of counties or equivalent divisions provided with local health service, reaching all rural sections thereof, under the direction of whole-time county or district health officers, was 203 at the beginning of the calendar year 1922, as against 161 at the beginning of the calendar year 1921, and 109 at the beginning of the calendar year 1920. This gain signifies that the cooperative demonstrations in rural health work, though as yet lamentably small in number, are making some impression upon the general situation.

During the fiscal year 1922, progress deserving especial mention was continued in Alabama, Georgia, Kansas, Kentucky, Montana, New Mexico, North Carolina, Ohio, Vermont, and Virginia, and was made in Louisiana, Mississippi, Missouri, and West Virginia. In Missouri a division of rural sanitation was organized in the State board of health and was directed by an officer of the Public Health Service detailed for duty with the State board in developing and supervising county health work; and appropriations, ranging from \$3,600 to \$12,000 a county, were made available from county sources for the support of county health departments on a basis of whole-time service in nine counties in addition to the two in which cooperative rural health projects were being conducted at the beginning of the fiscal year. In six of the nine additional counties whose local authorities made appropriations to secure the cooperation offered by the State board of health, the United States Public Health Service, and the International Health Board, whole-time personnel was engaged and active work was conducted during the year. In West Virginia, to which State, also, an officer of the Public Health Service is detailed to cooperate with the State board of health in developing and supervising whole-time county health service, arrangements were effected for cooperative health work under the direction of whole-time county health officers in four counties previously without such service.

¹⁴ Public Health Reports, vol. 37, No. 29, of July 21, 1922, pp. 1794-1799.

RESULTS.

The cooperative projects in the fiscal year ended June 30, 1922, yielded results exceeding in value many fold the cost of the work. Among the results to which especial consideration may be given are:

1. Public lectures presenting the principles and details of sanitation to over 277,000 persons.

2. Over 104,000 sanitary inspections of premises, with explanation of findings to occupants (or owners) of the properties.

3. Physical examination of over 142,000 school children, of whom over 91,000 were found to have incapacitating physical defects, with notification of parents or guardians of defects found.

4. Sixteen thousand six hundred and forty-five recorded treatments effecting correction of incapacitating physical defects among school children, brought about by written notifications to parents or guardians, follow-up visits to homes of the children, making available proper clinical facilities, and other activities of the county or district health departments.

5. Seven thousand eight hundred and eighty-two visits by health nurses to homes of cases of communicable disease to advise and show the afflicted households how to prevent the spread of the infections.

6. Three thousand and ninety-four visits by health nurses to prenatal cases to advise with and assist expectant mothers in carrying out hygienic and physiological measures making for healthy mothers and healthy babies.

7. Nine thousand six hundred and twenty-nine home visits by health nurses to demonstrate hygienic measures for the promotion of the health and the protection of the lives of infants.

8. Twenty-five thousand five hundred and forty persons inoculated for protection against typhoid fever.

9. Thirty-eight thousand two hundred and forty-one persons vaccinated against smallpox.

10. Three thousand eight hundred and eighty-seven children inoculated with toxin-antitoxin mixture for immunization against diphtheria.

11. Two thousand two hundred and forty-one persons treated effectively for relief from hookworm disease and for the prevention of the spread of the infection.

12. Marked reduction in the spread of malaria in hundreds of localities with an aggregate population of several hundred thousand.

13. Twenty-three thousand nine hundred and eighty-five treatments to rid persons of venereal disease infection and prevent the spread of the infection.

14. Five thousand eight hundred and ninety-six cases of dangerous communicable disease quarantined to prevent spread of infection in the local community, the State, and throughout the country.

15. The installation of 13,552 sanitary privies and 412 septic tanks at dwellings where previously there had been either grossly insanitary privies or no toilets of any sort.

16. Eight thousand four hundred and twenty privies repaired so as again to be of sanitary type.

17. Two thousand three hundred and one homes connected for the first time with sanitary sewers.

18. Two thousand nine hundred and fifty homes provided with clean water supplies in place of contaminated water supplies.

19. Radical improvement of 539 public milk supplies, distributed to a considerable extent through the channels of interstate commerce, to prevent the spread, through milk and milk products, of such infections as those of typhoid fever, scarlet fever, diphtheria, tuberculosis, septic sore throat, and infant diarrhea.

20. Two thousand two hundred and ninety-nine citizens over 40 years of age examined and advised about measures to conserve their vital capital.

Such results indicate that the plan of the work is both comprehensive and effective. Not for comparison but merely for example, specific results in a few of the separate projects are here cited.

In Madison County, Ala., a remarkable reduction in the death rate has been effected. The cooperative health work, under the direction of a whole-time county health officer, was begun in 1918. For the immediately preceding 10 years the annual death rate averaged over 19 per 1,000 of population. In the calendar year 1921 it was 12.6. The death rate among infants of less than 1 year in 1921 was only 77 per 1,000 births. The population of Madison County is about 50,000. A lowering of the death rate by 7 points, therefore, means 350 less deaths a year. The total annual expenditures for the support of the county health service have averaged about \$14,400 in the last three fiscal years. Saving lives of American citizens at a cost of less than \$50 a life saved seems reasonably good business.

In Mason County, Ky., the county health department, in the course of its general program of health work within the last several years, has accomplished a high degree of success in securing vaccination of the local population against smallpox. In the winter of 1921-22, smallpox, much of which was of malignant type, was highly prevalent within the vicinity of Mason County. In two villages, located near the Mason County line, in an adjoining county, 55 cases developed within the period December 1, 1921, to April 1, 1922. Within that period not a single case developed among the residents of Mason County.

In the eighth sanitary district of Vermont the potential value of health work among school children, to both the individual and the community, was exemplified by an instance remarkable because of its completeness. The whole-time district health officer, in the course of his first round of physical examination of school children, found, in October, 1919, at one of the large graded schools, 16 pupils of widely different ages who, because they were unable to keep up with their respective classes, were regarded as mentally backward and were assigned to a special room for simple instructions. Upon carefully examining the 16 children the health officer found that every one had one or more marked physical defects, among which decayed teeth, enlarged tonsils, adenoids, faulty eyesight, and poor hearing were common. With the cooperation of the school directors the health officer succeeded, within the next few months, by appeals to the parents and through special arrangements with local physicians, in having almost all of the physical defects found among the group corrected. On reexamination of the pupils a year later it was found that all of the previously backward children had been returned to their proper grades and were keeping up in them with their classmates.

Another year later, in December, 1921, some of those 16 children were among the physical and mental leaders in their grades.

In Cherokee County, Kans., the county health officer found, on his physical examination of school children in the winter of 1921-22, that 1,871 corrections of physical defects among the children had been made since his examination of them in the previous school term. In the fiscal year 1922 radical improvements were accomplished in outdoor sanitary conditions at hundreds of the rural homes. Two thousand five hundred and ninety-four persons were vaccinated against smallpox, and the county health officer or the county health nurse, or both, visited, once or more, every case of tuberculosis known to exist in the county and gave practical instructions to the patients and to the other members of their households in measures to prevent the spread of tubercular infection.

In Arlington County, Va., the program of rural health work, inaugurated in 1919, has been comprehensive and remarkably effective. The methods of excreta disposal have been changed from insanitary to sanitary at more than 3,600 of the 3,800 homes in the county. Hundreds of sources of domestic water supplies have been changed in character so as to be protected from potentially dangerous contamination. Over 80 per cent of the physical defects found among school children on the first round of inspection have been corrected. Among the children in three of the larger schools, a record of 100 per cent corrections of corrigible physical defects has been made. In the fiscal year 1922, the third year of the work, special activities were begun for the promotion of infant and maternity hygiene, for adult life extension, and for tuberculosis control. At the two baby clinics established in the county over 250 babies were examined in the first month of that special activity. All the activities are performed under the direction of one person, the whole-time county health officer. The program furnishes a striking example of a maximum of work with a minimum of overhead expense.

CONCLUSION.

The plan of cooperative rural health work in which the Public Health Service has been engaged during the last several fiscal years has proved economical and effective and should be extended, without unnecessary delay, to meet to a reasonably adequate degree the serious need of well-balanced, whole-time local health service in the rural districts of the United States.

STATISTICAL WORK.

In connection with studies of child hygiene and industrial hygiene and the investigations of pellagra, the work of analyzing and interpreting the statistics collected in the field has been of great assistance. The investigations of the rate of growth of children, the relation of physical defects in children to absence from school, and the heights and weights of children involved the use and interpretation of statistical data. Expert statistical knowledge was also needed in continuing the studies of industrial morbidity in which standardized sickness records are being developed. Certain phases of the pellagra investigations necessitated the employment of statistical analysis. Under

the section "Sanitary Reports and Statistics," page 211, there is given a detailed report of the work of the Statistical Office.

STREAM POLLUTION INVESTIGATIONS.

Investigations of stream pollution have been continued under the same organization and along the same lines as in the past, under the general direction of Surg. W. H. Frost, stationed at Baltimore, Md., with Sanitary Engineer R. E. Tarbett in immediate charge of the stream pollution laboratory at Cincinnati, and Sanitary Engineer J. K. Hoskins in charge of a study of the Illinois River, with headquarters at Peoria, Ill.

The most important addition to the organization during the past year has been the appointment of a group of consultants in stream pollution, consisting of Dr. E. O. Jordan, professor of hygiene and bacteriology, University of Chicago; Dr. Stephen A. Forbes, professor emeritus of biology, University of Illinois and director of the Illinois State Biological Survey, and Mr. Langdon Pearse, C. E., sanitary engineer for the sanitary district of Chicago. These consultants, representing the fields of bacteriology, fresh water biology, and sanitary engineering, respectively, have been brought into close touch with the current work of the service through several conferences with the officers in the field and through regular reports of progress. In addition to giving valuable advice relative to the studies now in progress, they have, by special request of the Surgeon General, prepared and submitted to the bureau a joint memorandum, outlining their view of present and future basic problems in stream pollution and of the field of the Public Health Service in studying them. This memorandum is now in press, for publication in an early issue of the Weekly Public Health Reports. The active interest of such a group of consultants not only insures the best advice obtainable in matters of technical detail, but also helps greatly toward keeping the work of the Public Health Service properly related on the one hand to the fundamental problems of biology and on the other hand to the practical requirements of sanitary engineering.

Another important addition to the organization has been the appointment of Dr. Lowell J. Reed, associate professor of biometry and vital statistics, Johns Hopkins University School of Hygiene and Public Health, as consultant in statistics, for occasional service in connection with the statistical analysis of data collected in stream pollution studies.

ILLINOIS RIVER INVESTIGATION.

The whole personnel available for field work, with a few exceptions, has been engaged during the entire year upon an intensive study of the pollution and natural purification of the Illinois River, which was begun during the latter part of the preceding fiscal year. The purposes and general plan of this study are discussed in the report for the year 1921. As there stated, the Illinois River was selected for study because its gross pollution immediately below the outlet of the Chicago Drainage Canal, and the absence of any further considerable pollution above Peoria, a distance of 160 miles, afford an unusual opportunity to study the processes of natural purification,

both chemical and bacteriological. Another important consideration was the active cooperation of the board of trustees and engineering staff of the sanitary district of Chicago, and the access through them to the valuable data already collected as the result of their studies.

Headquarters and a central laboratory were established in April, 1921, at Peoria, Ill., which is about midway between Chicago and the mouth of the Illinois River. During May, June, and July of that year, additional laboratories were established at Beardstown and Kampsville, Ill., below Peoria, and at Joliet, Ill., on the upper river, the sanitary district of Chicago contributing liberally toward the maintenance of the latter laboratory. Subsequently a laboratory established by the sanitary district of Chicago, at Argo, Ill., on the Chicago Drainage Canal, was put into operation on a schedule coordinated with that of the Public Health Service laboratories.

From each of these laboratories samples have been collected daily for bacteriological, chemical and biological examination. By the use of motor boats, interurban trolleys and bus lines, and by the employment of local sample collectors at some of the more distant stations, to collect samples and ship them by express to the nearest laboratory, it has been possible to reach some 40 sampling stations, located at intervals of 5 to 25 miles along the river, with another station on the Mississippi River above the junction of the Illinois.

Bacteriological examinations of the samples collected from these stations have been made at the Illinois River laboratories, also dissolved oxygen determinations, as these must be made upon fresh samples. Biological examinations and chemical analyses have been made at the Cincinnati laboratory, carefully preserved samples being shipped there periodically. Notwithstanding the many difficulties encountered during the winter, the schedule of sample collections and examinations has been maintained throughout the year, giving observations covering a full cycle of seasonal conditions.

As the funds available for support of this work were not sufficient for maintenance of the full complement of laboratories for the whole year, the laboratory at Beardstown, Ill., was discontinued November 15, 1921. In order to insure continued operation of the other laboratories throughout the year, the trustees of the sanitary district of Chicago assumed a considerable share of the operating expenses of the Joliet and Peoria laboratories from January 1 to July 1, 1922.

It was intended, when the laboratories were established, to continue them in operation only one year; but upon advice of the consultants it has since been decided to continue them in operation until September 15, 1922, thus accumulating observations through two summer periods.

Upon discontinuance of the laboratories in September, the permanent personnel assigned to them will be transferred to Cincinnati, for preparation of reports upon the investigation and to take up further studies.

CINCINNATI LABORATORY.

The work carried on at the Cincinnati laboratory has been chiefly the preparation of all bacteriological culture media for the Illinois River laboratories, the chemical and biological examination of samples shipped from these laboratories, and compilation of the

hydrometric data necessary for computing the discharge and velocity of the Illinois River during the period of observation. This, with the preparation of reports upon previously completed field work, has occupied the whole personnel of the station.

EXCRETA DISPOSAL STUDIES.

The board appointed to study the problem of sanitary disposal of human excreta in unsewered communities has continued studies at Washington, D. C., Arlington County, Va., Fort Caswell, N. C., and Wilmington, N. C.

GROUND WATER POLLUTION.

The pollution of the ground water involves two phases which are more or less distinct, namely, (A) the extension of pollution from the surface of the ground or from a privy down to the ground water table, and (B) the extension of the pollution after it has reached the water table. When the pit is dug into ground water these two phases merge into one.

(A) *Extension of pollution from the surface of the ground, or from a privy down to the ground water table.*—The biological law that bacteria, protozoa, and nematoda can not disperse in an absolutely dry ("bone-dry") medium is fundamental. Accordingly, when excreta are deposited upon a bone-dry soil or in a bone-dry pit, these organisms are imprisoned. The excreta, however, contain some moisture and as this sinks into the bone-dry soil the possibility is present for the organisms to travel or be carried as far as this moisture extends in sufficient quantity to permit active or passive motion on their part, but as soon as the organisms attain the periphery of the moisture they reach a barrier.

If other moisture (as rain water, for instance) enters the bone-dry soil and fills the voids in the dirt, the theoretical possibility is presented for the organisms to move or to be moved farther, namely, as far as this moisture extends. Accordingly, as long as there is a bone-dry layer of soil between the excreta and the water table, the organisms of the excreta can not reach the ground water table; an apparent exception to this general rule would be presented if the excreta were carried down by some actively moving animal (such as a crayfish, earthworm, etc.), but this exception would be only apparent, not real, for the carrier animal is not bone-dry (otherwise it would be dead and incapable of motion), hence the principle of the bone-dry barrier still holds.

Thus, in order that organisms in excreta can pass from the surface of the ground or from a privy down to the ground water table, the existence or the formation of a continuous or a progressive bridge or connection of sufficient water to permit them to move actively or passively is theoretically an absolute necessity.

The time involved in this movement down to the ground water table will of course vary according to circumstances, such as (a) the distance down to ground water, (b) the size of the voids in the soil, (c) the obstacles encountered (such as any film which may form, adverse chemical or temperature conditions of the soil), (d) natural enemies (competing or preying organisms), etc.

(B) *Extension of pollution after it has reached the ground water table.*—In case a pit or leaking privy extends into the ground water, or in case excreta are disposed of by dumping into an abandoned well containing water, the water table at this point is ipso facto polluted immediately by the organisms contained in the excreta; thus the conditions are of the same nature as in the case of an infection of the ground water table discussed in the foregoing paragraphs (A).

In considering the extension of the pollution after it has reached the ground water, it is necessary to hold in mind the point that immediately above the actual ground-water table (namely, the water-saturated or water-bearing stratum) there is a moist stratum known as the capillary fringe. This capillary fringe has not played much of a rôle in the literature on sanitation, but experiments now in progress indicate quite clearly that it must be given serious consideration in future work.

In considering the extension of pollution in ground water it is further necessary to hold in mind various important factors, as, for instance, (a) the slope of the water table, (b) the direction and flow of the underground water, (c) evaporation of ground water, (d) distance downward to which rain water can sink in the soil, (e) amount and regularity or irregularity of the rainfall, (f) intake area (neighboring or distant lakes or swamps, etc.) of the ground water, (g) viability of the fecal organisms, (h) reproductive power of the fecal organisms, (i) motility of the fecal organisms, (j) competing or preying organisms, (k) size of the voids in the soil, (l) chemistry and temperature of the soil, (m) geology of the soil, etc. Thus it is seen that the problem involved is exceedingly complicated.

An extensive series of experiments has been initiated at Fort Caswell, N. C., in connection with the two phases (A and B) of ground-water pollution. While final deduction must of course await completion of these experiments, certain facts can be reported upon at present, as follows:

If the ground water is polluted with fecal organisms (as *Bacillus coli*) and with uranin on the same day, the spread of the bacteria may lag a little behind that of the uranin. The spread need not be in a regular sheet, but it may be very irregular, reminding one of a cloud or of the movements of an *Amoeba*, and thus far it has taken the general direction of the flow of the ground water. On account of the irregular outline of the periphery of the extension of infection, some wells show the pollution while near-by wells give no evidence of it; further, a well of a given depth may show the pollution while a near-by well of another depth fails to show it. The pollution may not show in a given well, but it may show in the capillary fringe close to that well. The soil of the field where the experiments are being made is composed of sand and at places a peaty-like layer is found at various depths below the ground surface; this peaty-like stratum seems to influence the results obtained in one series of wells. The question whether the infection actually travels in the capillary fringe at times, or whether its apparent extension in this fringe is really due to a rise in the ground-water table (thus turning the capillary fringe of a given date into the water table of another date and extending the capillary fringe higher, toward the ground surface) is at present *sub judice*; but the point is established that the pol-

lution can actually exist (for a period of time as yet undetermined) in this fringe. Theoretically the point is obvious that any given pollution existing in the capillary fringe at a given time and left in that soil stratum by reason of a fall of the capillary fringe to a lower layer will eventually die if that stratum becomes bone-dry and remains so a sufficient length of time; thus, theoretically, and practically the capillary fringe, by reason of its rise and subsequent fall, is capable of playing an important rôle in disposing of pollution and thus freeing the ground water of various organisms. The question as to whether and to what extent the organisms in polluted ground water are carried up by capillarity into the capillary fringe, thus disposing eventually of the pollution of the water table, is exceedingly important but is at present *sub judice*. That the capillary fringe can, conversely, store up pollution for a longer or shorter time (as yet undetermined) and that this stored-up pollution might, because of a rise in ground-water level or a wash-down, again infect the ground water seems obvious. Thus, even if a given well shows a uranin-negative result, indicating the absence of pollution from a near-by privy, the capillary fringe above the ground-water level and close to the well sometimes contains pollution which can infect the well water later by being washed down the side of the well or by a rise in the water level in the well.

Thus the experiments at Fort Caswell seem at present to be furnishing definite data which are making more understandable certain practical points that have heretofore been obscure in connection with well-water and spring-water sanitation.

Definite satisfactory data to prove that contamination of the underground water moves in an uphill direction, namely, against the flow of the ground water, are lacking; but some findings possibly bearing on this problem are as yet not entirely explained. The foregoing studies have required the development of a new technique in taking samples from the ground-water table and this technique has resulted in the development of apparatus which will be described elsewhere and which seems to promise a wider field of usefulness than was at first apparent.

Rate of extension of pollution in the ground water of sand.—As already intimated, the rapidity of the spread of infection in ground water depends upon several factors. As instances of this rate, it may be stated that in one experiment (500) in sand soil, the ground water was polluted with cow dung plus uranin; later, on the eighth day, *Bacillus coli* was recovered 24 inches away, uranin 42 inches; on seventeenth day, *Bacillus coli* was recovered $7\frac{1}{2}$ feet away, uranin $11\frac{1}{4}$ feet; on nineteenth day, *Bacillus coli* was recovered 12 feet away, uranin 17 feet; on forty-third day, *Bacillus coli* was recovered 12 feet away, uranin 30 feet.

In another experiment (600) of the same kind, on the seventh day, *Bacillus coli* was recovered 2 feet away, uranin 2 feet; on tenth day, *Bacillus coli* was recovered 2 feet away, uranin 4 feet; on seventeenth day, *Bacillus coli* was recovered 6 feet away, uranin 6 feet; on twenty-first day, *Bacillus coli* was recovered 8 feet away, uranin 8 feet; on fifty-first day, *Bacillus coli* was recovered 8 feet away, uranin 30 feet.

VIABILITY OF FECAL ORGANISMS IN SAWDUST PITS.

From January 29 to March 5, 1920, quantities of human excreta were buried at Wilmington, N. C., under various conditions, especially in 17 sawdust pits; this material contained spores of Protozoa (especially *Endamoeba* and *Giardia*) and eggs of parasitic worms, especially two kinds of thin-shelled eggs (hookworms and *Hymenolepis nana*) and two kinds of thick-shelled eggs (*Ascaris lumbricoides* and *Trichuris trichiura*).

Examinations made in May, 1922, failed to show any recognizable cysts either of *Endamoeba* or of *Giardia*, or any recognizable eggs or larvæ of hookworms (*Necator*). But recognizable eggs of *Hymenolepis* (5 eggs), *Ascaris* (1,231 eggs), and *Trichuris* (40 eggs) were collected. Not one of these eggs was alive; in nearly all cases the degeneration of the protoplasm was extreme; in only one instance (an *Ascaris* egg) was the degeneration only slight.

Accordingly, present evidence is to the effect that under the climatic conditions which obtained at Wilmington during the past two to two and one-fourth years all traces of the cysts of *Giardia* and of *Endamoeba* disappeared from the human excreta buried in 17 sawdust pits; further, that the eggs of *Ascaris*, of *Trichuris*, and of *Hymenolepis nana*, died.

Bacteriological tests made of samples of excreta from the 17 pits showed that *B. coli* was still alive.

PUBLICATIONS.

A considerable amount of data has been collected in the files of the board and a portion of this has now been prepared for press and will be issued in bulletin form. The manuscript contains data on construction of privies, findings obtained on inspection trips, viability of fecal organisms, disinfection of excreta, and certain legal aspects of excreta disposal.

CONSTRUCTION.

A careful study has been made of the regulations of the United States, Canada, and the Philippines, governing the construction of privies. The data, so far as available, have been summarized and will soon be published, together with suggestions made by the board.

LEPROSY INVESTIGATION STATION, HONOLULU, HAWAII.

Surg. H. E. Hasseltine continued in his position as director of the leprosy investigation station during the year 1922.

As in the past five years, practically all work has been done at Kalihi Hospital, Honolulu, under a joint agreement with the Territorial board of health, whereby the Public Health Service furnishes medical attendance to the hospital and in return has free access to all cases in the hospital for such observation and research as may be deemed desirable. This agreement has been highly satisfactory to both parties concerned. The service officers devote their whole time to the consideration of leprosy, and, as all lepers in Hawaii enter segregation at Kalihi, the service is able to observe many early cases of the disease, which is the class of cases desired

for research work. The cooperation of the University of Hawaii, whereby the chemical laboratory of the university is used for the production of the ethyl esters of the fatty acids of chaulmoogra oil, and for chemical research, has been continued. The relations of these three branches, viz, the Territorial board of health, the University of Hawaii, and the Public Health Service, are most cordial.

A large majority of the patients in Kalihi Hospital have received the ethyl esters of the mixed fatty acids of chaulmoogra oil by intramuscular injection, which still remains the "standard" treatment. It is necessary to try other preparations on a group of patients in order to determine if such preparations give better results than the standard treatment, but thus far no appreciable improvement has been made over the mixed esters.

During the year one new chaulmoogra derivative, called dihydro-chaulmoogric acid, has been prepared, and a group of 10 patients has been treated with this preparation. Three of these patients have improved markedly, two have shown slight improvement, and three have remained stationary. Though it is too early to render a definite conclusion, the indications are that the ethyl esters of the mixed fatty acids of chaulmoogra oil are more effective than the ester of dihydro-chaulmoogric acid. The dihydro-chaulmoogric ester is a saturated compound and causes much less local reaction at the site of injection.

The groups of patients who were receiving treatment with the esters of single acids (chaulmoogric and hydrocarpic acids) were placed upon the mixed esters on January 1, 1922. While these single esters gave fair results, the improvement seen in those receiving the mixed esters was slightly greater than in those receiving the single esters. On January 1, 1922, the use of 2 per cent of iodine in the esters used for intramuscular injection was discontinued and the esters without iodine have been used since that date. Whether the ester-iodine preparation gives a better result or not can not be determined at present. Further work upon this question is necessary and will be carried out during the coming year.

The question of "leprous eruptions," mentioned in the last report still remains unexplained. It was thought that the omission of iodine from the treatment might throw some light upon this problem, but in May, 1922, an epidemic of severe eruptions took place, though no preparation containing iodine had been used for four months. In some cases the eruptions seem to have a seasonal prevalence. A number of such exacerbations have occurred in certain patients at approximately the anniversary of their admission, or of the first outbreak of the disease. Further observation is desirable before any conclusion is made.

In January, 1922, the treatment of a group of 10 patients by intravenous injection of the mixed ethyl esters was begun, and one case was given the ethyl ester of dihydro-chaulmoogric acid intravenously. In March the group receiving mixed esters was increased to 40 patients. The intravenous injections have been given twice a week in addition to their intramuscular injection. While the results have not been striking, it is noted that a more rapid improvement in the severe cases has followed the use of the esters intravenously. The intravenous injections cause a slight pulmonary irritation if given too rapidly, as evidenced by coughing immediately after the injection.

During the fiscal year 26 patients have been paroled and thus far none of these have shown any evidence of relapse. Though this is a smaller number than in the past three years, it is due to higher standard required before parole will be considered. The increase in the frequency of relapse in those paroled in recent years, notwithstanding that they have been on parole for a shorter period of time, has led to the establishment of more rigid requirements which must be met before parole is recommended. During the year 23 paroled patients relapsed and were returned to the hospital.

During the year 106 were admitted; of these 23 were relapsed paroled cases, making the number of strictly new cases admitted 83. Four cases have died during the year; two of these were not treated with the esters, as they died from advanced disease coexisting with leprosy at the time of their admission.

It becomes more apparent as time goes on that early diagnosis and treatment of leprosy is the keynote to successful results with our present remedial agents. Early cases of leprosy usually respond to treatment, while in most of the advanced cases the best that can be done is to stay the progress of the disease. A few advanced cases, however, show exceptional improvement and ultimately receive paroles.

Generally speaking, the people of Hawaii, especially the classes that furnish the greater number of lepers, are beginning to realize that leprosy will apparently yield to treatment, and if treated early, there is a fair chance of permanent arrest of the disease. This is reflected in the larger number of voluntary surrenders in the past year and the large number of relatively early and light cases that have been admitted.

The excellent morale of the patients in the hospital continues and is well illustrated by the number who volunteered as experimental subjects for intravenous injection. After excluding all under 21 years of age, 36 volunteered for intravenous injections, though only 10 were desired.

During the year many visitors from the United States and from foreign lands, have visited the station to obtain information concerning the methods and results of treatment. The following have remained for periods extending from two weeks to two months Dr. Eric Slack, Basutoland, South Africa; Dr. Rufino Abriol, Philippine Islands; Dr. R. G. Padua, Philippine Islands; Dr. A. Benchetrit, Venezuela.

At the invitation of the Venezuelan Government Prof. Richard Wrenshall, of the department of chemistry of the University of Hawaii, is spending the present summer in Venezuela to supervise the establishment of a laboratory for the manufacture of the ethyl esters in that country.

Chaulmoogra oil derivatives have been furnished by this station for the treatment of lepers to a number of health authorities in the insular possessions of the United States and in foreign countries.

ROBERSONVILLE, N. C.

On request of the State health authorities, assistance was rendered by the service in the diagnosis of cases of suspected leprosy. Surg. W. McCoy was assigned to investigate a case which occurred in Robersonville, N. C., June, 1922. Report was made that this was found to be a case of Morvan's disease.

HYGIENIC LABORATORY.

Buildings and equipment.—The fiscal year ended June 30, 1922, has been marked by material improvement in the equipment and in the facilities available for routine and research work at this station. The new south building and the new wing of the animal house have been satisfactorily equipped, and a large number of new animal cages provided, very materially increasing the facilities of the laboratory. A tunnel is being constructed between the north and the south buildings, giving convenient access from one building to the other in all weather.

Laboratory investigations.—It has been the policy to have the work of the Hygienic Laboratory guided into channels of fundamental research so far as practicable and this has been carried forward with most gratifying results during the year. A brief account of the work of the various divisions of the laboratory follows.

Instruction given.—During the year a total of 29 persons took instruction at the laboratory. Of this number, 11 were service officers, 4 were trainees under the Vocational Education Board, 4 took instruction in Wassermann technique, and 7 doctors from foreign countries spent from three to eight weeks each studying technique and laboratory methods pertaining to public health. Of these 7 foreign doctors, 1 each came from Norway and Poland and the other 5 from Czechoslovakia.

Classes of instruction for Public Health Service officers.—It was formerly the practice to assign such commissioned officers of the service as had exhibited special aptitude for laboratory work, and could be spared from the other stations of the service, to the Hygienic Laboratory for courses of instruction lasting some three or four months. This practice was necessarily abandoned during and immediately following the war. It is a source of considerable satisfaction that it has again become possible to resume this practice, and it is believed upon an improved basis. During the late autumn of 1921 six student officers were detailed to the Hygienic Laboratory and remained until the following June. The course of instruction differed from those previously given in its greater length and in the fact that greater prominence was given to subjects of public health interest not necessarily associated with laboratory bench work. This was made possible by arranging a series of lectures, demonstrations, quizzes and exercises, which were conducted by officers of the service and other recognized authorities having special familiarity with the particular subjects considered. The bench work consisted of exercises in bacteriology, immunology, zoology, chemistry, pharmacology and allied subjects intended to illustrate the bearing of these subjects upon public health, and to enable the student to perform such procedures as his subsequent duties might require, and to evaluate the work of technicians over whom he might have supervision.

Another class of six student officers was assigned to the laboratory about June 1, 1922. It is thought that these courses of instruction represent an important function of the laboratory, which can hardly fail to develop the native talent of the officers who participate to a state of greater usefulness for the service and the country. The

work of the class is under the direct supervision of Surg. A. M. Stimson, the assistant director.

Compensation.—There is need for material increase in compensation of the personnel coming under civil-service provisions. It is hoped that legislation now pending will materially improve the compensation of many of our research workers and other employees.

Advisory board.—A meeting of the advisory board of the Hygienic Laboratory was held May 4, 1922. The activities in which the laboratory has been and is engaged were reviewed in some detail and the Surgeon General and laboratory staff given the benefit of the criticism and suggestions of the board.

DIVISION OF PATHOLOGY AND BACTERIOLOGY.

Biologic products.—During the year just ended two relatively new subjects have occupied a large part of the time devoted to the control of biologic products. These are the standardization of the toxin-antitoxin mixture so much used in the prevention of diphtheria, and the standardization of the diphtheria toxin for the Schick test used for the detection of persons susceptible to diphtheria. In each case it has seemed wise to require the manufacturers to submit samples of each batch of the preparation for the approval of the Hygienic Laboratory before distribution into commercial channels. This method of control, while in some respects burdensome and expensive, is believed to be warranted by the greater security afforded both to the consumer and the producer.

Routine examinations of serums, viruses, toxins, and analogous products during the year have been as follows:

Product.	For purity.	For potency.
Diphtheria antitoxin.....	68	83
Tetanus antitoxin.....	26	32
Botulinus antitoxin.....	15	27
Antipneumococcic serum.....	102	121
Antimeningococcic serum.....	164	186
Antistreptococcic serum.....	40	40
Antidysenteric serum.....	15	22
Miscellaneous serums.....	80	.....
Tuberculins.....	43	.....
Rabies vaccine.....	38	30
Vaccine virus.....	24	.....
Miscellaneous bacterial vaccines.....	359	.....
Typhoid vaccines.....	71	71
Pollen extracts.....	47	.....
Diphtheria toxin-antitoxin mixture.....	132	126
Diphtheria toxin for Schick test.....	46	.....
Animal epidermal extract.....	8	46
Total.....	1,278	784 1,278
Arsphenamine and allied preparations:		2,062
For composition (tests made in division of chemistry).....	627	
For toxicity (tests made in division of pathology and bacteriology).....	901	
		1,528
Grand total.....		3,590

A new lot of tetanus toxin for official control has been prepared and is now being distributed. The Hygienic Laboratory standards for tetanus antitoxin and diphtheria antitoxin now go to the following countries:

STANDARD DIPHTHERIA ANTITOXIN.

Australia.....	2	Java.....	1
Belgium.....	2	Peru.....	1
Brazil.....	5	Portugal.....	1
Colombia.....	1	Spain.....	2
Czechoslovakia.....	1	Switzerland.....	1
England.....	7	South Africa.....	1
France.....	3	Uruguay.....	1
Italy.....	3		
Japan.....	1		33

STANDARD TETANUS ANTITOXIN.

Australia.....	2	Japan.....	1
Belgium.....	2	Java.....	1
Brazil.....	5	Portugal.....	1
Colombia.....	1	Spain.....	1
Czechoslovakia.....	1	Switzerland.....	1
England.....	4	Uruguay.....	1
France.....	3		
Italy.....	3		27

General routine activities.—During the year a survey of the stock cultures at the Hygienic Laboratory has been begun with the object of determining the validity of the identifications. So far few discrepancies between the label indicating the species and the identification based on the cultural and biochemical reactions of the organisms have been observed.

The following routine examinations have been made:

Catgut for sterility.....	65
Heads for rabies.....	43
Sputum.....	27
Urine.....	46
Disinfectants.....	10
Tissues.....	146
Cultures.....	218
Stomach contents.....	1
Water.....	225
Smears.....	17
Spinal fluid.....	39
Milk.....	10
Wassermanns.....	6,441
Miscellaneous.....	221

7,509

The following routine clinical work was done:

Typhoid vaccine administered.....	49
Treatments for dog bites.....	9
Physical examinations.....	26
Smallpox vaccinations.....	12
Yellow fever inoculations.....	3
Sick calls.....	92

Tularaemia.—The work on tularaemia, conducted by Surg. Edward Francis and his associates, has gone forward with most gratifying results. New cultural conditions for *B. tularensis* have been defined, new intermediate hosts for the organism have been ascertained, much new light obtained on the clinical aspects of the

disease, and in general very noteworthy contributions to our knowledge of the organism and the disease caused by it have been made.

All of the officers and employees of the Hygienic Laboratory who have participated actively in the work on tularaemia have developed the disease. Fortunately, a complete recovery has been made in each case.

Smallpox.—Surg. James P. Leake conducted an investigation of smallpox with the particular object in view of ascertaining the source of the rather highly fatal outbreak which occurred in Kansas City, Mo., and Kansas City, Kans., in the autumn of 1921 and for the purpose of securing accurate information on the protection afforded by the strains of vaccine virus currently used against this infection. No success attended the efforts at tracing the source of the outbreak but it was shown that the vaccine produced in the United States was highly efficient against even the rather severe type of smallpox which was prevailing in the locality visited.

Studies on nutrition.—Surg. Goldberger, with the aid of Passed Asst. Surg. Lake, has undertaken certain experiments, the main objectives of which are (1) to determine in what manner dogs and rats react to a diet that in humans would be pellagra producing, (2) to determine the effect (in rats) of supplementing such diet with casein and with various other proteins, (3) to identify the amino acids that must be added to such diet to render the amino acid supply satisfactory (in the nutrition of the rat).

A minor but practically important objective is the development of optimal diets for the various species of laboratory animals. Actually a diet for rats is being tested.

These experiments were begun early in January and are still in progress. The results so far attained do not permit definite interpretation but the indications are that they will be of great value.

Tuberculosis investigations.—The program which had been planned when work on tuberculosis was begun was necessarily curtailed for lack of the services of an expert in experimental tuberculosis who could give that close and continued attention to the work which is essential to its successful prosecution. Such experiments as were performed, however, were carried out with careful attention to detail under the immediate attention of Assistant Director A. M. Stimson and were productive of useful information.

A small series of rabbits was subjected to an experiment of a preliminary nature with the object of determining the comparative effect of a tuberculous antigen administered intravenously, and of dead tubercle bacilli given by spraying into the respiratory tract and by feeding, upon the production of antibodies in the blood and resistance to subsequent virulent infection. The method of infection employed was by spraying a suspension of bovine tubercle bacilli into the respiratory passages. The chief interest in the result centers around the effect of this virulent inoculation. The lesions in nearly all of the animals, including the untreated control group, were confined to the lungs. In many a very extensive and slowly progressive pulmonary tuberculosis was produced which showed no tendency to generalization. Since this form of lesion closely simulates the predominant one in human tuberculosis, and would appear to give opportunity for the beneficial action of drugs or other forms of treatment capable of exerting such, it would seem that the method of

inoculation (at least with this particular culture) which produced it is a valuable addition to experimental tuberculosis. As regards the main objects of the experiment, the results were briefly these: Resistance to virulent inoculation was not increased either by the intravenous administration of the antigen or by feeding, and spraying killed tubercle bacilli, while the production of complement-fixing antibodies was readily achieved by the former and appeared to be hindered if anything by the latter.

In another experiment the method of virulent inoculation above described was applied to a chemical treatment for human tuberculosis which is now enjoying some vogue. It was thought that this method would afford the most favorable opportunity for the treatment to exert any beneficial action of which it was capable under experimental conditions. The results, however, showed no appreciable difference between the treated animals and the untreated control animals. In both groups animals were found which when killed after some six months exhibited very extensive pulmonary lesions, while the fact that some animals escaped without discoverable lesions demonstrated that the dose of tubercle bacilli administered had been minimal. No tendency to generalization of the disease was noted in any animal. It is felt that as a result of these preliminary experiments the service has been put in a better position to evaluate experimentally certain classes of "tuberculosis cures" which may come under its official purview.

Pneumonia.—The branch laboratory at New York City has continued its investigations on pneumonia under the direction of Special Expert Russell L. Cecil. Interesting observations on immunity have been made as well as studies on the clinical aspects on the large number of cases available at Bellevue Hospital. What may be described as a refined antipneumococcus serum was used on approximately 500 cases, 500 similar cases being observed as controls, the latter not being subjected to any special form of treatment.

It is felt that the results are not so conspicuously successful as to warrant recommendation of this method of treatment as a routine procedure. The serum preparation in question gives rise to very severe febrile reactions with the occasional development of alarming symptoms. It is planned during the coming year to apply other biological therapeutic measures to patients available.

It was shown by experiments on monkeys that intratracheal administration of antipneumococcus vaccine (Type I) gives rise to a very high degree of immunity against subsequent infections of virulent pneumococci of the homologous type.

Botulism.—Some remarkably interesting observations have been made by Assistant Bacteriologist I. A. Bengtson on an organism of the botulinus group derived from *Lucilia Caesar*¹⁵ larvae from the carcass of a fowl dead of "limberneck." It was impossible to be certain of the exact source of the organism on account of the opportunities for contamination before the larvae were received. The organism itself was culturally somewhat similar to the true botulinus organism; however, the toxin produced by it was not neutralized by any of the antiserum available, but it was neutralized by antiserum produced against the homologous strain. Perhaps the most inter-

¹⁵ Preliminary note published in Public Health Reports, Jan. 27, 1922 (and Reprint 726).

esting feature in connection with this organism was the fact that single cell isolations varied most markedly in ability to produce toxin. Certain cells gave cultures with high toxin-forming capacity, while others were inert in this respect.

Meningitis.—The examination and type determination by Assistant Bacteriologist A. C. Evans of various meningococcus cultures isolated during the past two years have shown a rather remarkable and possibly significant shift in the types prevailing now as compared with those prevailing in the previous years, as illustrated by the following table:

TABLE I.—*Tropin grouping of meningococci.*

Group.	1918-19 (63 strains).	1921 (27 strains).	1922 (14 strains).
	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
R.....	61.9	33.3	35.7
S.....	25.4	33.3	0
T.....	4.7	0	0
U.....	1.6	0	0
Z.....	6.4	25.9	42.9
Not to be classified in the above groups.....	0	7.5	21.5

TABLE II.—*Agglutinin grouping of meningococci.*

Group.	1918-19 (128 strains).	1921 (16 strains).	1922 (15 strains).
	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
I.....	37.5	18.7	6.7
II.....	25.8	18.7	0
III.....	21.1	12.6	0
IV.....	2.3	6.3	13.3
Not to be classified in the above groups.....	13.3	43.7	80.0

Detailed study of the strains which failed to fall into the established agglutinin types and tropin groups did not reveal new serological groups, but showed that the recently isolated strains are weak and indefinite in their serological properties.

Rocky Mountain spotted fever.—During the end of the year the investigations on Rocky Mountain spotted fever, which were carried on at the Hygienic Laboratory some years ago and dropped on account of the press of work incident to the war, have again been undertaken. The first direction which these investigations have assumed is in the attempt to cultivate the virus but so far without success. (See detailed report p. 26.)

Miscellaneous.—In addition to these major lines of investigation attempts have been made to group streptococci with reference to serum production, to standardize antidysenteric serum, to cultivate the rabies organism, to elucidate the etiology of lethargic encephalitis, but without results which would warrant special discussion.

DIVISION OF ZOOLOGY.

During the entire fiscal year the professor of zoology has had headquarters at the Hygienic Laboratory, but he has been occupied

for a major portion of his time in his duties as chairman of the board on excreta disposal (see p. 60).

International commission on zoological nomenclature.—Following the post-bellum reorganization of the commission, a number of cases have been submitted for opinions, but world conditions have been such that it has been exceedingly difficult to make satisfactory progress. Opinions Nos. 68 to 77 have been published.

Index catalogue of medical and veterinary zoology.—Work on the host catalogue was suspended during the fiscal year 1920-21, because of pressure of other duties, but during the fiscal year 1921-22 this work has been taken up again and considerable progress has been made. The extensive changes that have taken place in the classification of parasites since 1902 have naturally added greatly to the amount of work involved in listing the parasitic diseases of a given host and the ever-increasing literature, especially on the protozoan infections, has extended this catalogue far beyond what was originally foreseen.

Examination for determination of intestinal parasites.—For a number of years numerous specimens were examined for physicians as pure routine in diagnosis, as there were very few places where there were laboratory workers especially trained in this procedure. As the laboratories of State boards of health and of hospitals have taken up this routine work to an ever-increasing degree, it has been the policy of the division of zoology to confine its examinations, so far as possible, to cases which were in doubt or in dispute, or in the line of special research. Despite this policy, the division has during 1921-22 been called upon to make 240 examinations for various boards of health, hospitals, and other organizations, or for physicians.

Specimen collection.—Pressure of other work has precluded the possibility of adding to the collection to any extent.

Studies in amebiasis.—An extensive manuscript on amebiasis, based upon the work done by the division of zoology during 1920-21, has been written and has been submitted for publication.

Board on excreta disposal.—The professor of zoology has continued to serve as chairman of the board on excreta disposal, with work at Washington, D. C., Arlington, Va., Wilmington, N. C., and Fort Caswell, N. C. The report of the board is printed on page 60. An extensive bulletin has been prepared and will soon be submitted for publication. Of the 25 articles contained in the manuscript, 15 emanated from the division of zoology, Hygienic Laboratory.

Instruction.—For practically one month, the entire time of the personnel of the division of zoology was occupied in connection with the course of instruction given at the Hygienic Laboratory to the class composed of commissioned medical officers of the service.

DIVISION OF PHARMACOLOGY.

Chemotherapy of syphilis.—(1) *Mechanism of therapeutic action of arsenicals.*—Considerable progress has been made in the study of this fundamental problem. The determination of the rate of excretion of the arsenic of different type arsenicals from the system has shown that both the toxicity of the drug for the host and the parasitocidal potency are roughly proportionate to the capacity of the host to retain the arsenic, thus showing that drugs with a great affinity for

the tissues (organotropic properties) are most effective in curing the infection. This is contrary to the prevailing conception that a drug must have very little affinity for the tissues in order to be of practical value in the treatment of syphilis and allied diseases. Further proof of the above conclusion was furnished by experiments on animals with ligated ureters or bile duct. When the paths of excretion are blocked relatively little toxic and parasiticial arsenicals become much more toxic and parasiticial.

Evidence was obtained which supports the assumption that the physiological intracellular iron acts as a catalytic agent in the conversion within the body of arsphenamine into the active "arsenoxide" modification. A systematic study of the distribution in the tissues and body fluids of the arsenic of arsphenamine and related compounds injected intravenously has shown that certain organs as the liver, spleen, kidney have a great affinity for arsenic, and withdraw it within a short time from the blood. The liver excretes a considerable amount of arsenic through the bile, and the spinal fluid contains only traces of arsenic after an arsphenamine injection.

The production of arsenic resistant parasites has been studied by means of quantitative methods. Toward the end of the year the investigation of the drug resistance of trypanosomes in different hosts and as affected by a temporary passage through another host has been studied, particular attention being paid to the relation between virulence and drug resistance.

Preliminary experiments have been carried out on the discovery of the constituent of protoplasm which is presumably acted upon by the drug, with results which make it very hopeful that the intimate intracellular mechanism of the biological action of arsenic may be elucidated.

(2) *Relative therapeutic action of arsphenamine and neoarsphenamine.*—The results obtained two years ago with commercial lots of these two drugs were confirmed by an examination of some thirty lots of recent manufacture. It was shown that, whereas arsphenamine of different manufacture varies only slightly in parasiticial properties, neoarsphenamine shows very marked variations. This confirms the results of the chemical examination, which also indicate that neoarsphenamine is of less constant chemical composition than arsphenamine. These findings have led to the issue of a recommendation by the Surgeon General to the marine hospitals urging the clinical use of arsphenamine in preference to neoarsphenamine. It is quite possible that the adoption of the trypanocidal test in the official control of the therapeutic properties of commercial neoarsphenamine may lead to a greater uniformity of this drug.

(3) *Sulpharsphenamine.*—On the basis of work referred to in the last report, which showed that the arsphenamines produce as good a therapeutic effect when given intramuscularly as when injected intravenously, sulpharsphenamine of French manufacture was investigated experimentally. It was found that this drug is satisfactory for subcutaneous administration, as it does not cause pain or local tissue changes. The solution of the drug is relatively stable, a distinct advantage over neoarsphenamine. The chemical, physical, and biological properties of the drug were established. The principal advantage of this drug over the older preparations is that the technic of its injection is exceedingly simple. This fact will make it possible

for any physician to use it. Furthermore, since the subcutaneous administration of this arsenical is probably less apt to produce acute toxic reactions such as occur after intravenous medication, the treatment is safer.

(4) *Drugs for the treatment of neurosyphilis.*—This investigation was continued with the principal aim of producing an arsenical with a higher power for penetrating nerve tissue than that possessed by the arsphenamines. Several pentavalent arsenicals were shown to be satisfactory in this respect under experimental conditions. One of these compounds has recently been subjected by French investigators to a clinical trial as a substitute for arsphenamine in the treatment of syphilis with reported good results. The use of this drug for the treatment of early tabes and general paralysis therefore appears very promising, and a sufficient quantity of the drug is now available for a clinical trial.

Chemotherapy of tuberculosis.—The work on the elaboration of drugs which might prove useful in the treatment of tuberculosis was continued. This problem is obviously of a very difficult nature and so far has not yielded positive results. Numerous chemicals, including bactericidal dyes, metal compounds, etc., have been tested as to their influence on experimental tuberculosis in guinea pigs and rabbits. Incidentally a method was worked out for producing with great constancy testicular tuberculosis in rabbits, a type of infection which appears to possess certain advantages for the determination of the effect of chemicals on readily accessible tuberculous tissue. Considerable time was devoted to the study of the effect of variation of diet on the course of experimental tuberculosis, with particular reference to the action of cod liver oil, a remedy which seems to possess some practical value.

Another phase of the investigation dealt with the action of certain drugs upon the CO_2 production of a suspension of tubercle bacilli in the test tube. It was shown by quantitative measurements of the CO_2 production that the tubercle bacillus is relatively more resistant to acids than other organisms. Similar experiments were carried out with various unsaturated fatty acids, including chaulmoogric acid.

In order to obtain information with regard to the penetration of chemicals into bacteria, numerous experiments were made on the electrical changes occurring in a suspension of such cells in various fluid media. This work aims at the elucidation of the more fundamental questions involved in antiseptic and bactericidal action. In similar work with large-celled algæ the first direct proof was furnished for the penetration of such ions as lithium, cæsium, and strontium into the interior of the cell.

Hookworm remedies.—It was shown by extensive experiments that ascaridol is the principal active component of oil of chenopodium. Inasmuch as the ascaridol content varies in different commercial samples of the oil it appears desirable to substitute the crude oil by ascaridol in the treatment of hookworm infection for the reason that ascaridol can be obtained in chemically pure form, thus insuring constancy in biological action.

Standardization of pituitary extract.—Recent work on the biological standardization of commercial pituitary extract has shown that the use of histamine or potassium chloride, substances which have been

recommended as standards, does not always yield reliable results. Work is therefore in progress to test out the feasibility of using a standard pituitary preparation, which could be furnished to manufacturers by a central laboratory. Work on this problem is urgently needed as the improper adjustment of the dose of pituitary for the purpose of inducing labor is not without serious danger to the life of mother and child.

Nature of morphin addiction.—For the past few years one of the members of the division has devoted considerable time to the problem of drug addiction in connection with the enforcement of the anti-narcotic law. At the present time he is engaged with the director of the laboratory in a research, which deals with the study of the increased tolerance for morphin in monkeys with particular reference to antibody formation.

Cooperation with the committee of revision of the United States Pharmacopœia and the committee for revision of the National Formulary.—Hygienic Laboratory Bulletin No. 129, entitled "Digest of Comments on the Pharmacopœia of the United States of America and on the National Formulary for the Calendar Year 1919," has been published and distributed. The manuscript for the 1920 digest is in the hands of the printer and a very considerable amount of work has been done on the digest for 1921. It is hoped that it will be possible to bring this series of bulletins, which have been of great assistance to the revision committee, up to date by the end of the year 1922.

One of the members of the division is a member of the revision committee and is serving as chairman of the subcommittee on nomenclature, and as a member of the subcommittees on scope and tables, weights, and measures.

Miscellaneous activities.—A large quantity of the ethyl esters of chaulmoogra oil was prepared and distributed to physicians interested in the treatment of leprosy. The standard strain of trypanosomes used in the work on chemotherapy was supplied to various laboratories (research and commercial) interested in chemotherapy. Different samples of ouabain were tested as to toxicity for use in the official bio-assay of digitalis, and satisfactory samples were supplied to certain manufacturers.

Numerous samples of tincture of digitalis, anesthetic ether, whisky, etc., were tested for the office of Public Health Service hospitals and the purveying depot.

The division continued the toxicity control of commercial arsphenamine during the first quarter of the year, the division of pathology and bacteriology taking over this work for the rest of the year.

Assistance was given the Bureau of Chemistry of the Department of Agriculture in the control of commercial nitroglycerin for medicinal use. This work involved the physiological standardization of tablets containing this drug, in order to check up the accuracy and reliability of the chemical examination. It was shown that the latter yields results which conform with those obtained by means of the bio-assay.

From time to time staff meetings were held for the purpose of discussing the work carried on by the division. Numerous inquiries of a toxicological, pharmacological, or physiological nature were answered.

DIVISION OF CHEMISTRY.

Oxidation-reduction equilibria.—Most living cells appear to be dependent upon the oxygen of the atmosphere and the processes of oxidation are of fundamental importance to the chemistry of life. However, oxidation is but the face of a shield of which reduction is the obverse. Therefore an indirect method of attacking problems of oxidation is the study of reduction. An electrical method for the measurement of the intensity of reduction in biological fluids is being developed. The observations made with this method have proved to be reliable in the main, but subject to uncertainties which seriously injure the quantitative value of measurements. To develop a method with which to check the often uncertain values given by the electrical method, studies have been continued upon the equilibria of oxidation-reduction indicators. This has necessitated the synthesis of new compounds and the preparation of many intermediates. There were prepared in a high degree of purity the mono-, di-, tri, and tetra-sulfonates of indigo, a sulfonate of thioindigo scarlet, a sulfonate of indophenine, a sulfonate of thioindigo. Several derivatives of thioindoxyl and of pyrrol are being purified. Syntheses were also made of several new indophenols and their intermediates.

The oxidation-reduction potentials of several of these compounds have been measured at various p_H values and the data reported before the American Chemical Society.

A mathematical analysis of the data has been made and a generalized expression of the oxidation-reduction potentials of organic compounds has been deduced.

Biological oxidation reduction.—Reduction by bacterial cultures has been used as favorable material for the study of certain general principles of biological-reduction processes. Uncertainties in the electrical method of measurement have been studied by means of reduction indicators and some suggestive information obtained.

The fundamental phenomenon in the reduction of methylene blue by milk (a test of great usefulness in judging the sanitary quality of milk) has been illuminated and it has been shown that the complete course of the reduction can be followed electrometrically. The same is true of the Schardinger reaction.

An examination has been made of the methylene blue reduction test used in determining the putrescibility of sewage and the pollution of streams. It has been shown that electrometric methods are applicable in cases where methylene blue is precipitated. It has also been shown that the so-called relative stability numbers used in classifying sewages are without fundamental foundation.

Rough correlations have been made between the levels of reduction intensity attained in cultures and the type of organism concerned.

Alum process for clarification of water.—The most widely used process for the clarification of municipal water supplies consists in the formation of a flocculent precipitate of aluminum hydroxid followed by sand filtration. The precipitated aluminum hydroxid, besides removing much of the color and turbidity, carries down most of the bacteria of potential danger to the health of the community. The amount and character of the precipitate formed by the interaction of the alkali in the water and the alum added depend upon factors which hitherto have not been systematically investigated.

In cooperation with the office of stream pollution investigations, the division of chemistry has made a study of the relation between hydrogen ion concentration and the precipitate formed from alum solutions.

It has been found that there is a minimum time required for coagulation when the pH of the solution is at or near 5.5. An empirical equation has been found for the time of coagulation when the pH is varied from 5.5 and all other conditions are held constant. Large effects upon rate of coagulation may be found by agitation.

The optimum of pH 5.5 also gives the best quality of floc.

The optimum of pH 5.5 has been correlated with field studies made by others, indicating that great economy in the use of alum can be effected by p_H control at filter plants.

Tabulation of acid-base indicators.—There are a great many acid-base indicators, the hydrogen-ion ranges of which are scattered through the literature. No recent tabulation of these data has been available. The division of chemistry has searched the literature, determined the pH ranges of indicators available at the Hygienic Laboratory, and brought to light many discrepancies. The data have been tabulated by name of compound and pH range and a list of indicator synonyms has been prepared.

This tabulation makes it possible to interpret some of the data upon the physiological effect of acids and bases which were recorded in the older literature before the modern system of expression was formulated.

Attempts to isolate the antineuritic "vitamine" from yeast.—While an enormous amount of work is being done in various parts of the world upon so-called vitamins, comparatively little advance has been made in the chemical identification of any one of these mysterious bodies. The division of chemistry is attempting to isolate the antineuritic "vitamine" from yeast.

Improvements have been made in the fuller's earth method for concentrating the vitamin fraction of yeast extracts. The physiological method of testing the activity of preparations has been systematized and many fractionations made with various modifications of the silver method have been tested.

While no definite pure vitamin has yet been isolated, the results which have been published in the papers listed in another section are suggestive.

Chemical examination of arsphenamine and other arsenicals.—The division of chemistry has charge of the chemical analysis of arsenicals. Six hundred and thirteen samples of arsphenamine and neoarsphenamine and 14 samples of "silver salvarsan" were analyzed. While chemical examinations will be continued, the uniformity of certain products has justified a slackening of the rigid scrutiny hitherto used.

Estimation of sulphate in neoarsphenamine.—For proper control of arsenicals new or improved analytical methods are needed.

A method has been worked out whereby the sulphate in neoarsphenamine can be determined directly in the neoarsphenamine solution without the preliminary precipitation, filtration, etc., of the formaldehyde sulphylic acid derivative of the arseno base which is required by the method used heretofore. By this simplified method there is much saving of time and labor. Furthermore, the results

obtained have shown that there are less chances for error by this simplified method than by the older method. The results have shown that there is quite a large variation in the sulphate content of commercial samples of neoarsphenamine. When calculated as Na_2SO_4 , the results showed a variation from a minimum of 1.4 per cent to a maximum of 17.6 per cent.

Acid-base equilibria of arsphenamine.—The conduct of arsenicals introduced into the body depends in no small measure upon their acidic and basic properties. Therefore, as an aid to the chemotherapeutic studies being made by the division of pharmacology, a study of the acid-base equilibria of arsenicals has been inaugurated by the division of chemistry.

The titration curve of arsphenamine made with the hydrogen electrode was reported last year. The importance of the subject justified further experiments with other methods before publication. An attempt was made to apply the quinhydrone electrode, but it was found to be inapplicable. The rate of hydrolysis of methyl acetate gave pH values for the acid solution which checked the hydrogen electrode measurements. Other methods are being applied to the alkaline solutions.

Miscellaneous.—Assistance was given to the pellagra studies of Surg. Joseph Goldberger by the preparation of 15,040 doses of salt mixtures for feeding experiments, by 23 analyses of material used in feeding experiments, and by the conversion of a large quantity of lysine picrate to lysine dihydrochloride.

A large number of standard solutions and indicator solutions were prepared for other divisions of the Hygienic Laboratory or for other offices of the service.

A bibliography on hydrogen-ion concentration was brought up to date.

Five miscellaneous analyses were made for the purveyor's office, one of these leading to the discovery that the Dispensary has not distinguished between the di and tri sodium salts of orthophosphoric acid.

Fifty-three analyses of diverse materials from a variety of sources occupied considerable time.

VIRUSES, SERUMS, TOXINS, AND ANALOGOUS PRODUCTS.

In connection with the enforcement of the law of July 1, 1902, governing the manufacture, importation, and sale of viruses, serums, toxins, and analogous products, inspections were made of American and European establishments holding or applying for licenses.

The routine has consisted of the inspection of the plants of manufacturers with a view to determining their compliance with the standards which have been established as essential to the holding of licenses, and the examination of the products at the Hygienic Laboratory.

At the close of the fiscal year 43 establishments held licenses for interstate traffic in biologic products. Of these 35 were American concerns and 8 were foreign firms. This is an increase of 2 establishments over the preceding fiscal year.

There are now 104 different biological products licensed for interstate traffic.

The laboratory investigations relating to viruses, serums, toxins, and analogous products are reviewed on page 67.

CONFERENCE WITH STATE AND TERRITORIAL HEALTH AUTHORITIES.

This conference is convened by the Surgeon General of the United States Public Health Service under the act of Congress July 1, 1902. The twentieth annual conference of State and Territorial health authorities with the United States Public Health Service was held in Washington, D. C., May 17 and 18, 1922.

The program follows:

Anthrax.

Discussion of amendments to interstate quarantine regulations.

Problems of interstate health work.

Control of water supplies used in interstate traffic.

Discussion of chlorine as a means of insuring the safety of drinking water.

The value of colon bacillus as an index of potability of water.

Cooperative certification procedure.

Coordination of effort and promotion of efficiency in the field of sanitary engineering.

Transportation of lepers.

Uniform parole system.

Trachoma.

Cooperative malaria control work.

Paris green as a larvicide.

Methods of evaluation of results of local measures for the control of malaria.

Registration area for morbidity.

The relation of the public and medical profession in the conservation of health.

Venereal diseases.

Proposed program for the ensuing fiscal year.

State work in venereal diseases control.

Cooperative rural health work.

Child hygiene.

Résumé of activities of the Public Health Service.

Provisions of the act of November 23, 1921, entitled "Promotion of the welfare and hygiene of maternity and infancy, and for other purposes," with special reference to detailed plans for carrying out the provisions of the act as specified in section 8.

Effect of distribution by official agencies of biologic products on child morbidity and mortality.

Toxin-antitoxin and Schick reaction.

State-wide programs for the application of the Schick test and toxin-antitoxin immunization.

Standardizing technique.

Sanitary supervision of milk supplies.

Nutritional diseases.

Vaccination against smallpox.

Industrial hygiene.

Report of the conference on the education of sanitarians.

Immigration problems.

Rabies eradication by vaccination of dogs.

Committee reports were made in regard to morbidity returns, regulations, rural sanitation, and trachoma, and a progress report of the board of excreta disposal was given.

REPRESENTATION AT MEETINGS OF SCIENTIFIC AND SANITARY ASSOCIATIONS AND CONGRESSES.

During the year service officers have attended a large number of annual and other meetings of scientific and sanitary associations and congresses. In most cases the representatives have given papers relating to public health, and in all have gained information of importance to the work of the service.

DISSEMINATION OF INFORMATION.

Information regarding the results of studies and investigations of the division has been disseminated by means of interviews and conferences with health authorities following particular studies within their jurisdiction, publications, other reports, lectures, and correspondence.

Interviews and conferences.—The results of investigations undertaken on the request of State and local authorities to meet an emergency are often given verbally as soon as obtained, with recommendations submitted for the improvement of the existing conditions, in order that remedial action may be immediately taken.

Publications.—Articles on health topics are prepared for the weekly Public Health Reports, and for special publications, such as Public Health bulletins and Hygienic Laboratory bulletins. Many of the investigations referred to above are reported in these publications.

Other reports.—In many cases typewritten reports of investigations are furnished the authorities concerned.

Lectures.—In addition to addresses given at meetings of scientific and sanitary associations, popular lectures are given from time to time. By these lectures officers in the field bring to the attention of the public the activities of the service.

Correspondence.—A large number of replies are made to letters requesting information of a hygienic or public health nature.

DIVISION OF DOMESTIC (INTERSTATE) QUARANTINE.

In charge of Asst. Surg. Gen. A. J. McLAUGHLIN.

The activities of this division during the past fiscal year to suppress epidemics and to prevent the interstate spread of disease included (1) plague suppressive measures; (2) the carrying out of service policies for the prevention of epidemics by assisting State health departments in establishing and improving divisions of communicable diseases and sanitary engineering; (3) assisting the National Park Service of the Interior Department in providing adequate medical attention and improving the sanitary conditions of the national parks; (4) control of water supplies used for drinking and culinary purposes by interstate carriers; and (5) supervision over sanitary and health conditions on interstate carriers affecting the travel of persons and transportation of things.

PLAGUE SUPPRESSIVE MEASURES.

As foretold in the last annual report, in view of effective results obtained during the past two fiscal years with the plague suppressive measures instituted and the fact that no new outbreak occurred, the station at Pensacola, Fla., was discontinued on August 15, 1921, and the station at Beaumont, Tex., was discontinued on December 31, 1921; the Galveston station was continued from January 1, 1922, with reduced force; and the New Orleans station was continued but with the personnel and office reduced to the same status as before the plague outbreak of 1919, so as to provide a trained organization as a nucleus to cope with future plague outbreaks. Upon the discontinuance of service activities in Beaumont and Port Arthur, rodent trapping and rat-proofing operations were continued under the supervision of the city authorities.

The operations for the control of plague in California have been continued, and squirrel-free zones have been maintained between the infected territory and the rat population of San Francisco, Oakland, and Berkeley. Rat-trapping measures were carried out in San Francisco.

In order to investigate conditions in New England seaports and to provide trained personnel to cope with possible plague outbreaks in this region, arrangements have been made with the State departments of health and through them with the city health departments whereby the service will assist in rat-trapping measures and in examining the rats caught by detailing experienced personnel as may be found necessary.

PLAGUE SUPPRESSIVE MEASURES, NEW ORLEANS, LA.

During the fiscal year ending June 30, 1922, all plague suppressive measures in the city of New Orleans were conducted, as in former years, under the supervision of the United States Public Health Service, working in close cooperation with the local authorities.

Throughout the year no human plague occurred and only one case of rodent plague was recorded, occurring on August 10, 1921, thus bringing to an apparently successful conclusion the 1919 antiplague campaign. This is based on the disappearance of the evidence of plague in humans or rodents in a period covering several months of active field work.

ORGANIZATION.

Passed Asst. Surg. M. S. Lombard remained in charge of the campaign, assisted by Acting Asst. Surg. R. E. Bodet. All laboratory measures remained under the supervision of Surg. C. L. Williams until this officer was relieved to resume his former duties with the Louisiana State Board of Health, remaining available, however, in an advisory capacity. The total force averaged 90 employees.

OUTGOING MARITIME QUARANTINE.

Quarantine restrictions for the prevention of both the introduction and the exportation of plague by ships were strictly enforced. Cheerful compliance and full cooperation by the New Orleans Steamship Association, the various individual agents, and masters and owners of vessels was the rule.

During the first half of the fiscal year the quarantine restrictions imposed on vessels mooring at local wharves were those that had been promulgated earlier in the calendar year, which modified the original restrictions so as to conform to the improved conditions. Vessels lying alongside the wharves that had been repaired in accordance with the service regulations were fumigated for the destruction of rodents not oftener than once in three months, and were not required to fend off or to use rat guards on connecting lines. Vessels that at any time lay alongside wharves that had not been rat proofed were required to comply with all outgoing quarantine requirements as originally promulgated.

Whenever the circumstances permitted, a thorough and complete search for dead rats followed each fumigation. When practical, intensive trapping on board ships was performed before fumigation.

As 64,342 rodents were classified and examined and neither human nor rodent plague had been discovered for one year, the Surgeon General approved the field officer's recommendation to extend the period of fumigation of vessels mooring at rat-proof wharves from 3 to 6 months.

Sanitary changes in accordance with local health ordinances and United States quarantine regulations had been made in a large number of wharves with work in progress at several others. The dock board advised that funds were available to be used for the repair of the two remaining non-rat-proofed wharves, located in a small area of the water front. At these wharves it was deemed necessary to maintain outgoing restrictions until the sanitary changes were completed.

The personnel of the quarantine division was adequate to meet the port requirements and competent to fumigate eight average-size vessels each day. Maritime commerce was interfered with as little as possible.

Charges for labor in the fumigation of vessels from foreign ports were made according to Department Circular No. 207, but the mate-

rial and apparatus, in accordance with previously established practice, were furnished by the New Orleans Steamship Association, for which charges were made by that organization direct.

The standards for fumigation with hydrocyanic acid gas for rodent destruction, as stated in the United States quarantine regulations, were strictly observed. On account of the great danger to human life, arrangements were always made for the safe disposition of the crew during the fumigation process. In each case a written statement was obtained from the captain or first officer that the vessel was ready for fumigation and that every member of the crew had been accounted for. No one was permitted to enter any compartment until such space was declared safe by the medical officer in charge of the fumigation.

Tabulated operations of out going quarantine were as follows:

Number of vessels inspected for rat guards.....	1 9,993
Number of vessels fumigated with sulphur	0
Number of vessels fumigated with cyanide gas	757
Pounds of sulphur used.....	0
Pounds of cyanide used.....	60,001
Pints of sulphuric acid used.....	90,001
Total number of "vessels fumigated" certificates issued.....	757
Clean bills of health issued.....	2,589
Foul bills of health issued.....	29
Number of vessels cleared.....	2,618
Total number of bills of health issued (including additional ports of call)...	5,448
Total amount of charges reported to collector of customs.....	\$22,992.75
Total number of rats killed by the fumigation of vessels.....	2,239
By species:	
<i>Mus norvegicus</i>	135
<i>Mus alexandrinus</i>	1,171
<i>Mus rattus</i>	818
<i>Mus musculus</i>	110
Miscellaneous.....	5
Number of fumigated rodents found plague infected.....	0

LABORATORY.

The established practice of previous years was followed in the laboratory. All rodents secured by the field forces were sent to the laboratory for classification and examination. Rodents were dissected and examined; a record was kept of the location of capture of each rodent received, and the various procedures necessary for the confirmation of a provisional diagnosis of plague were carried out. Fleas and live rats were collected and classified for survey purposes.

When the usual laboratory procedures failed any longer to show plague in the field, it was deemed necessary to employ additional methods for detecting the disease, especially in rodents macroscopically negative. To accomplish this, at the end of each day's examinations, combination inoculations of all rodents presenting even doubtful lesions were made, with the result that one positive finding was recorded during the second month of the fiscal year just ended. This positive case occurred on August 10, 1921, four months after the last distinctly positive plague rat was found.

The expedient was taken primarily to reduce the total number of guinea pigs inoculated with suspicious material. Later, when plague in the field was not found, it was considered necessary to establish

¹ Each entry and each shifting of mooring counted.

with certainty the date of occurrence of the last plague positive case, for the reason that the chance of overlooking an infected animal with obscure lesions was too great, in view of the large number of rats that daily reached the laboratory.

On previous occasions experiments consisting in the adding of a small portion of known infected tissues to the presumably negative lot prior to emulsification in each instance determined the reliability of the test by giving positive results.

The combination, or composite, or mass, inoculation consisted in the inoculation of a guinea pig with an emulsion of tissues from two or more rodents, sometimes from as many as several hundred, to determine the existence or nonexistence of plague in any of them.

Great care has always been exercised in the laboratory and various methods were employed for the detection of plague in the animals received. To the end of the fiscal year there have been classified at the laboratory 195,698 rodents, of which number 130,899 were examined for plague infection by species as follows:

Species.	Total number examined.	Male.	Female.
<i>Mus norvegicus</i>	101,284	65,648	35,636
<i>Mus rattus</i>	9,548	6,132	3,416
<i>Mus alexandrinus</i>	15,039	9,817	5,242
<i>Mus musculus</i>	0	0	0
Wood rats	41	6	35
Putrid	4,868		

In addition to the above, the laboratory reported the receipt of the following animals, by species:

Musk rats	61
White rats	37

Total animals, all species, classified and examined, 195,698.

FLEA SURVEY.

All live rats received at the laboratory were examined for fleas.

Total number <i>Mus norvegicus</i> examined	3,634
<i>L. Cheopis</i>	6,084
<i>C. Canis</i>	673
<i>C. Musculi</i>	9,786
Total	16,543
Total number <i>Mus alexandrinus</i> and <i>mus rattus</i> examined	204
<i>L. Cheopis</i>	482
<i>C. Canis</i>	51
<i>C. Musculi</i>	483
Total	1,016
Total number of all other species examined	1
Number of fleas found	0
Total number of rats examined for fleas	3,839

Flea infestation of rats, temperature, and average number of fleas per rat per month are given in the following table:

Month.	Mean temperature.	Total rats examined.	Total fleas examined.	Fleas per rat.
1921.				
July.....	83.1	227	983	4.3
August.....	84.2	183	747	4.8
September.....	83.4	None.	None.	None.
October.....	71.2	41	147	3.6
November.....	66.6	159	315	1.9
December.....	60.8	83	260	3.1
1922.				
January.....	85.5	194	586	3.0
February.....	62.2	251	979	3.9
March.....	62.3	606	2,895	4.8
April.....	72.6	726	3,534	4.9
May.....	75.7	808	4,301	4.8
June.....	81.8	490	2,206	4.5

THE LAST RECORDED PLAGUE CASE.

The last plague case discovered in New Orleans was that confirmed in rodents in September, 1921. This positive case was the result of a combination inoculation made on August 10, 1921, of three rodents presenting scars that macroscopically indicated resolving plague.

TRAPPING.

The destruction of rats and the locating of infected areas in a plague-infected community depends primarily on trapping. The extent and progress of the epizootic can only be determined by effective trapping, correlated with laboratory examinations. For this reason an efficient trapping force is of utmost importance in anti-plague campaigns, and no effort has been spared in an endeavor to maintain a perfect organization. This organization of the field forces was patterned after service methods used in former campaigns. A squad of five to eight men, under the immediate charge of a foreman, was the unit, and the number of squads depended upon the extent of the general trapping area.

With the lapse of the second year of the 1919 campaign, during which no plague was found in the outskirts of the general trapping area, this area was again restricted, with another proportionate reduction in the trapping personnel. At this time 60 trappers were employed, operating a daily average of 10,000 traps. The original trapping areas were but little disturbed at any time, and the work was entirely abandoned only in those sections which were proved plague free for a period of not less than one year.

With the lapse of an additional six months another slight reduction was effected; on this occasion, due to the entire absence of plague in the community, the trapping force was reduced from 60 to 40 men.

There occurred in April, 1922, a high-water stage of the Mississippi River, which very nearly reached the top of the artificial levees lining the river banks. In New Orleans this had the effect of thoroughly destroying all rat harborage that might have existed under the local wharves on the river side of the structures.

To insure against inland migration and, at the same time, detect, if possible, any latent plague among the rodents, the entire trapping force was concentrated along the river front, covering all the most advantageous points. To further stimulate this "rout the rat" scheme, the city board of health increased the plague rat premium from \$5 to \$25. While it was the belief that no additional rodent plague was likely to be discovered, still all local health authorities agreed that the campaign had reached the crucial point, and that no effort, on the part of the entire eradication machinery, should be spared to locate and destroy remaining infection.

The total number of rats trapped from July 1, 1921, to June 30, 1922, was 181,326, of which 2,052 were trapped on vessels, 6,566 were trapped on wharves, and 170,469 were trapped on other premises. Not included in the total were 14,372 rodents found dead by trappers.

The rodents recovered by the trappers, by species, were:

<i>Mus norvegicus</i>	92,936
<i>Mus rattus</i>	8,317
<i>Mus alexandrinus</i>	13,118
<i>Mus musculus</i>	64,582
Wood rats.....	37
Unclassified.....	97

The rodents found dead, by species, were:

<i>Mus norvegicus</i>	8,213
<i>Mus rattus</i>	413
<i>Mus alexandrinus</i>	770
<i>Mus musculus</i>	107
Wood rats.....	1
Unclassified.....	4,868

The rat catch per month and the average daily rat and mouse catch per man during this period is given in the following table:

Month.	Trapping days.	Number of rats.	Rats per man per day.	Number of mice.	Mice per man per day.
1921.					
July.....	2,575	18,207	7.07	11,827	4.59
August.....	1,649	10,051	6.09	8,123	4.92
September.....	720	6,290	8.79	3,506	5.67
October.....	718	6,470	9.01	4,083	5.01
November.....	691	9,216	13.34	3,600	5.21
December.....	1,216	8,792	7.15	5,691	4.68
1922.					
January.....	1,254	9,527	7.60	6,174	4.92
February.....	1,157	10,619	9.17	5,498	4.76
March.....	1,241	12,057	9.71	5,029	4.05
April.....	1,222	11,740	9.61	4,516	3.69
May.....	1,203	16,502	13.71	4,000	3.32
June.....	872	11,019	12.63	1,991	2.28

GARBAGE AND REFUSE DISPOSAL.

After a careful study of the garbage problem, with special reference to its bearing upon the plague situation, early in 1921, the city engineers submitted to the proper city authorities a carefully prepared report, giving details of a plan, which was promptly adopted. The outstanding new feature of this was the provision for city owned and operated garbage-collecting equipment and incinerators. When

the recommended plan is in full operation, a revised garbage ordinance will be enacted to meet the new conditions.

A review of the situation in New Orleans, as regards the collection and disposal of garbage and mixed refuse, shows that some improvement has been made during the past year, particularly along the lines of a more dependable and regular house-to-house collection service. The improvement is reflected by the increase in city expenditures for the service, and the decrease in the number of complaints received from housekeepers.

Progressive steps accomplished the past year in dealing with the garbage problem, are as follows:

1. The separation of the garbage-collection forces into a distinct working organization, under the direction of a garbage superintendent.

2. The purchase by the city authorities of forty-eight 4 cubic-yard garbage-collection trailers, equipped with steel water-tight containers which replace approximately 100 of the old dump carts.

3. The abandonment of five of the eight interior "dumps."

4. The placing under construction of one of the five proposed incinerators with a capacity for destroying 100 tons per day of mixed refuse, and which will be in operation October 1, 1922.

5. The extension of the daily collection areas into some of the out-lying districts not previously served.

6. The purchase of three autotrucks in connection with the inauguration of a truck-trailer system, and the purchase of a locomotive crane to promote efficient operation at the Agriculture Street dump.

The recent count made in May, 1922, gives the daily average amount of municipal refuse collected as 990 cubic yards. Converting this quantity into tons, as determined by measuring and weighing the mixed refuse for a week in one of the subdivisions of the city where facilities for measuring and weighing existed, it developed that the daily average amount collected was 338 tons. Of this total, 246 tons, or 63.4 per cent, are taken to the Agriculture Street dump, 81 tons, or 20.9 per cent, to the Clio Street dump, and 61 tons, or 15.7 per cent, to the South Hagan Avenue dump.

The placing in operation of incinerator D, now under construction, will permit the discontinuance of the Clio Street dump and the South Hagan Avenue dump, for the reason that the collection areas, tributary to these dumps, can be served, at a slightly increased hauling expense, by the incinerator. While recognizing that the present amount of refuse brought to these dumps exceeds the rated capacity of the incinerator referred to, this capacity is a guaranteed performance for 16 hours' operation and can be exceeded 50 per cent if 24 hours is decided upon. Besides it is confidently expected by the builders that the rated or guaranteed capacity will be exceeded at least 40 per cent.

The site for incinerator B has been purchased by the city and negotiations for incinerator C have been temporarily halted for financial reasons. Sufficient funds, in anticipation, were set aside for the construction of three incinerators this year, but a recent decision of the State supreme court prevented the city from collecting taxes and has reduced the funds that were carried on the city's books as collectible. The effect of this decision will be to limit the construction program to one incinerator per year.

RAT-PROOFING.

The enforcement of the rat-proofing ordinance constituted the bulk of the eradication work and the methods employed were those provided for in what was known as Ordinance No. 2512, C.C.S. This ordinance provided for the rat-proofing of all structures then existent or to be built in the future. Prior to granting a building permit for a new construction, or for the reconstruction of buildings, the city architect required that all applications be inspected and approved by the service. In addition to the requirements for buildings, provisions were included for maintaining all premises free and clean of rubbish or material that might serve as rat harborage.

Of special interest was the sanitary work accomplished near the water front by the dock board and the railroad companies. All wharves, with two exceptions, and all railroad warehouses were generally reconstructed and concrete floors were laid.

Of the 438 legal cases, 260 affidavits were withdrawn by the service on account of compliance before trial; 1 violator was convicted; 177 cases are still pending:

A summary of rat-proofing operations follows:

Notices served.....	953
New buildings inspected.....	2,791
Number of premises inspected.....	19,398
Number of premises abated.....	3,167
By elevation.....	599
By marginal wall.....	332
By concrete floor and wall.....	793
By minor repairs.....	1,279
Total buildings rat-proofed.....	3,003
Buildings demolished.....	164
Total buildings rat-proofed to date.....	172,390
Character of structures and number rat-proofed:	
Main buildings, class A.....	236
Main buildings, class B.....	1,428
Sheds and outhouses, class A.....	720
Sheds and outhouses, class B.....	619
	3,003

Character of structures.	Square yards concrete.	Linear- foot wall.	Elevated.	Cost.
Main buildings A.....	52,420	31,510	.....	\$1,537,781.00
Main buildings B.....	.....	23,264	492	1,422,632.00
Sheds and outhouses A.....	12,379	8,483	.....	194,230.00
Sheds and outhouses B.....	.....	900	107	15,691.00
Total.....	64,799	64,157	599	3,170,334.00

¹ New constructions included.

Rat-proofing in New Orleans was the foremost factor in the eradication work and not only safeguarded the health of citizens but also protected the city from a commercially ruinous quarantine.

For plague-eradication purposes, from epidemiological studies made during the campaign, it appeared convincing that all rat-proofing, at least, at plague foci and immediate vicinity, should be completed preferably by the laying of concrete or other impervious material

in a manner that rodents may be "built out" and dark spaces eliminated so that "dormant" infected places may not be reached by the migrating animals.

Concrete floors have proven an economic gain in the warehouses where there is considerable trucking done by reducing the amount of labor. With smooth flooring, fewer men can handle ordinary trucks and electric trucks, in many instances, have supplemented the manpower ones.

In a general way, it may be stated that the 1919 campaign consisted of two distinct periods of activities, differing from each other by the character of the field work that predominated at the time.

First. The time during which plague suppressive measures constituted the bulk of service activities; and

Second. The time during which plague eradivative measures were carried out.

The first period extended from the time the first human case was discovered to the occurrence of the last human case. This period was marked by a few months of rapid rat-harborage destruction. Despite the severe infection that was found at several foci, only 18 human cases in all occurred, not a large number, when the heavy rodent infection and diverse foci are considered.

The second period extended from the time the last human case occurred to the close of the fiscal year just ended. During this period the primary aim was the complete obliteration of foci of infection and the prevention of the creation of new foci. For such a purpose rat-proofing and intensive trapping were believed to have been particularly valuable, and it seemed plausible to assume that when pockets of infection were effectively buried under the lasting concrete works, healthy migratory rodents were not exposed to the disease.

Experience in this epizootic has shown that plague can exist in rodents with little or no macroscopic signs and that all the facts in the epidemiology of rodent plagues are not yet available. Time alone will tell whether the real objective has been attained. At this time we must confine ourselves to the gratifying observation that the disease has been entirely absent from New Orleans for a period of almost 11 months, during which no effort has been spared to find trace of plague.

It is again proper to record the universal spirit of cooperation the service encountered in New Orleans and to acknowledge the ever-ready assistance of State and city officials, the various commercial and financial organizations, the public press, and numerous influential citizens. The combined efforts of these agencies made it possible to conduct the campaign to an apparently successful conclusion without any impediment to commerce and with a mortality of only eight humans.

PLAGUE SUPPRESSIVE MEASURES, PENSACOLA, FLA.

The plague suppressive measures at Pensacola, Fla., during the past fiscal year up to the close of the station on August 15, 1921, were carried out under the direction of Passed Asst. Surg. R. R. Spencer.

LABORATORY OPERATIONS FROM JULY 1, 1921, TO JULY 28, 1921.

The following rodents were classified and examined in the laboratory:

<i>Mus norvegicus</i>	215
<i>Mus alexandrinus</i>	128
<i>Mus rattus</i>	19
<i>Mus musculus</i>	1,708
Wood rats.....	5
Putrid and unclassified.....	45
Total.....	2,120

The average daily rat and mouse catch per man from July 1, 1921, to July 28, 1921, is given in the following table:

Month.	Trapper days.	Number of rats.	Average number of rats per man a day.	Number of mice.	Average number of mice per man a day.
July.....	237	412	1.7	1,708	7.2

RAT-PROOFING.

The tabulation below gives the rat-proofing data from July 1, 1921, to July 31, 1921, the date when trapping operations were discontinued:

Square yards of concrete floor laid.....	503
Linear feet of area wall installed.....	488
Linear feet of flashing installed.....	15
Square yards of planking removed.....	1,154
Main buildings, class A, rat-proofed.....	11
Main buildings, class B, rat-proofed.....	36
Total main buildings.....	47
Outbuildings, class A, rat-proofed.....	0
Outbuildings, class B, rat-proofed.....	54
Total outbuildings.....	54
Buildings abated by:	
Elevation.....	19
Marginal wall.....	1
Concrete floor and wall.....	3
Wiring over existing floor.....	6
Minor repairs.....	71
Total buildings rat-proofed.....	100
Building demolished.....	1
Total buildings abated.....	101
Cost of main buildings.....	\$3,473.00
Cost of outbuildings.....	\$312.00
Total cost.....	\$3,785.00

PLAGUE SUPPRESSIVE MEASURES AT GALVESTON, TEX.

Plague suppressive measures at Galveston, Tex., during the past fiscal year were carried out under the direction of Surg. H. F. White. The following cases of plague were reported:

Human cases.....	0
Rodent cases.....	8

OUTGOING QUARANTINE.

This phase of the work was carried on in cooperation with State and municipal authorities, together with masters of vessels, agents, and the local maritime association.

Vessels which entered the port of Galveston and docked at non-rat-proofed piers were required to comply with the following regulations:

1. To be breasted off at least 4 feet from the pier.
2. To rat guard all hawsers and lines from ship to pier.
3. To raise gangway at night or 100-candle power cluster of lights to shine thereon.
4. To fumigate every three months.

In January, 1922, the Galveston Wharf Co. rat-proofed Piers 11, 12, 37, and 38, and the Mexican Petroleum Co. rat-proofed Piers 4 and 5, which greatly modified the restrictions for ships docked at the piers. In March, 1922, the Southern Pacific Steamship Co. rat-proofed Piers A, B, C, and Sunset Elevator Dock and other property.

Vessels lying at rat-proofed piers were required to be fumigated once every six months. In each instance hydrocyanic-acid gas was employed. Each vessel after fumigation was thoroughly searched for rodents.

Tabulated operations of outgoing quarantine were as follows:

Number of rodents killed by fumigation of vessels.....	452
Number of fumigation certificates issued.....	248
Number of clean bills of health issued.....	971
Number of foul bills of health issued.....	138
Bills issued including ports of call.....	2,353
Number of vessels clearing.....	1,109
Number of fumigations.....	248
Pounds of cyanide used.....	22,669
Pints of acid used.....	34,003½
Number of vessels inspected for rat guards (trips).....	10,950

In addition, the following fumigating operations were conducted:

Number of buildings fumigated.....	8
Pints of acid used.....	879
Pounds of cyanide used.....	586

LABORATORY.

All rodents trapped were sent to the laboratory for examination and a record was kept of the location of each rat received. In addition to the usual examination, the rats were separated into groups according to the location from which they were received and a combination or mass inoculation was made from each group. During the fiscal year 1,318 mass inoculations were made. There were classified at the laboratory 43,423 rodents, of which 17,521 were examined. Over 50 per cent of the rodents received were mice, indicating a marked decrease in the rat population of the city. Mice were not examined.

Species.	Number received.	Number examined.
<i>Mus norvegicus</i>	11,537	11,506
<i>Mus rattus</i>	797	797
<i>Mus alexandrinus</i>	1,859	1,859
Wood rats.....	3,356	3,356
<i>Mus musculus</i>	23,408	0
Putrid.....	2,463	0
Other rodents.....	3	3
Total rodents.....	43,423	17,521

FLEA COUNT.

<i>Mus norvegicus</i> , number examined.....	53
Fleas per rat:	
<i>L. cheopis</i>	26.9
<i>C. musculi</i>.....	.21
<i>P. felis</i>.....	.21
<i>S. gallinacea</i>.....	.07
<i>Mus alexandrinus</i> , number examined.....	8
Fleas per rat:	
<i>L. cheopis</i>	9
Total number of rats examined.....	56
Total number of fleas found.....	1,381
Number of fleas per rat.....	24.66

During the fiscal year the examination of rats for gross lesions did not reveal any plague-infected rodents; mass inoculations were positive for plague in eight cases.

TRAPPING.

Destruction of rats and the finding of infected areas depend principally upon trapping and complete laboratory examination of all rodents.

The following numbers of rodents were trapped during the fiscal year:

<i>Mus norvegicus</i>	11,537
<i>Mus rattus</i>	797
<i>Mus alexandrinus</i>	1,859
<i>Mus musculus</i>	23,408
Other rodents.....	5,822
Total.....	43,423

RAT-PROOFING.

A summary of rat-proofing operations in the city of Galveston during the past fiscal year is as follows:

	Class A.	Class B.
By elevation.....	89	401
By chain wall.....	29	49
By demolition.....	126	74
By concrete floor and chain wall.....	184	10
By new construction.....	34	283
By minor repairs.....	268	3,137
Total.....	730	3,954

Outhouses, sheds, and cisterns rat proofed.....	621
Lineal feet chain wall.....	242,396
Square yards of concrete.....	143,103
Lineal feet wall fill.....	20,140
Square yards planking removed.....	220,108
Total number of abatements.....	4,684

RODENT SURVEY AT HOUSTON, TEX.

A rodent survey was conducted in cooperation with the municipal authorities at Houston, Tex., during the month of July, 1921, under the supervision of Surg. H. F. White.

The following rodents were trapped, shipped to Galveston, classified and examined in the service laboratory. No plague-infected rodents were found.

<i>Mus norvegicus</i>	7, 533
<i>Mus alexandrinus</i>	1, 338
<i>Mus rattus</i>	151
<i>Mus musculus</i>	1, 287
Total.....	10, 309

PLAGUE SUPPRESSIVE MEASURES AT BEAUMONT, TEX.

Plague suppressive and eradicated measures in the city of Beaumont were continued with Surg. H. F. White in charge until December 31, 1921. Fumigation of buildings and premises and trapping operations were discontinued on July 31, 1921.

LABORATORY.

The following rodents were secured by trappers from July 1 to 31, 1921, and sent to the laboratory for classification and examination. No plague-infected rodents were found.

<i>Mus norvegicus</i>	154
<i>Mus rattus</i>	10
<i>Mus alexandrinus</i>	120
<i>Mus musculus</i>	170
Putrid and unclassified.....	10
Total.....	464

FUMIGATION.

The following table shows the fumigation operations from July 1 to 31, 1921:

Number of buildings fumigated.....	1
Pounds of cyanide used.....	200
Pints of sulphuric acid used.....	350
Total cubic feet of space fumigated.....	1, 500, 000

RAT-PROOFING.

A summary of rat-proofing operations in the city of Beaumont from July 1, 1921, to December 31, 1921, is as follows:

Number of affidavits filed.....	81
Number of notices served.....	380
Number of premises inspected.....	6, 452
Number of premises abated.....	647
By elevation.....	552
By marginal wall.....	7
By concrete floor and wall.....	60
By minor repairs.....	452
Total buildings rat-proofed.....	1, 110
Buildings demolished.....	56
Square yards of planking removed.....	5, 335

PLAGUE SUPPRESSIVE MEASURES AT SEATTLE, WASH.

During the fiscal year ending June 30, 1922, the plague suppressive measures on the Puget Sound were continued under the direction of Surg. Hugh de Valin.

Rat-proofing.

New buildings inspected.....	388
New buildings reinspected.....	675
Floors concreted, new buildings (177,415 square feet).....	97
Basements concreted, new buildings (132,295 square feet).....	86
Yards concreted, new buildings (41,513 square feet).....	44
Sidewalks concreted.....square feet..	145,165
Total concrete laid, new buildings.....square feet..	351,223
New buildings elevated.....	35
New buildings rat-proofed, concrete.....	217
Old buildings rat-proofed, concrete.....	39
Old buildings inspected.....	39
Floors concreted, old buildings (45,720 square feet).....	39
Rat holes cemented.....	70
Wooden floors removed.....	39
Buildings razed.....	25
Wire screening used.....square feet..	1,286

Water front.

Vessels inspected.....	597
Vessels fumigated.....	116
Sulphur used.....pounds..	198,050
New rat guards installed.....	198
Defective rat guards repaired.....	487
Fumigation certificates issued.....	116
Canal Zone certificates issued.....	43
Port sanitary statements issued.....	1,629

Laboratory operations.

Dead rats received.....	142
Rats trapped and killed.....	13,635
Rats after fumigation.....	1,365
Total rats.....	15,142
Rodents examined for plague infection.....	12,439
Rodents proven plague infected.....	0
Blocks poisoned.....	113
Poison distributed, pounds.....	711

Classification of rodents.

<i>Mus rattus</i>	1,533
<i>Mus alexandrinus</i>	2,288
<i>Mus norvegicus</i>	9,541
<i>Mus musculus</i>	1,674
Total rodents.....	15,152

Miscellaneous work.

Letters sent contractors, rat-proofed, new buildings.....	252
Letters sent re rat complaints.....	11

PLAGUE SUPPRESSIVE MEASURES AT SAN FRANCISCO, CALIF.

Passed Asst. Surg. W. T. Harrison remained in charge of plague suppressive measures in California until relieved by Senior Surg. J. C. Perry on October 19, 1921. The activities carried out during the year can be classified under three general headings: (a) Operations in the field for ground squirrel control; (b) sanitary inspections in San Francisco; and (c) work in the Federal laboratory.

During the year the officers in charge of this work have acted in an advisory capacity on many questions of sanitation and their cooperation assisted in having a rat-proof building ordinance enacted for the city of Oakland.

The danger of extension of plague infection from the squirrels to the rats in east-bay cities has been emphasized to the local health authorities of these cities, and the health officer of Oakland has asked for an appropriation for the ensuing year for the purpose of having rats caught and examined in order to determine if any plague infection exists among these rodents. A campaign will be outlined as soon as the appropriation becomes available.

The importance of catching rats in San Francisco in sufficient numbers to determine whether any plague infection exists, has been presented to the authorities and the health officer realizes the desirability of such a procedure. However, the supervisors have failed to appropriate the sum required. A limited number of rats have been caught in the vicinity of the slaughterhouses by an employe of the butchers, and these have been examined in the laboratory.

One case of human plague occurred June 29, 1922, in Alameda County, one-half mile from Dublin. The infection was contracted from squirrels, as the premises were badly infected with these rodents and fleas. Squirrels shot near this place were proven positive for plague infection on July 14, 1922. It is believed that plague infection is still rather widely disseminated among the ground squirrels in localities where infection in these rodents has previously been determined.

FIELD OPERATIONS FOR THE CONTROL OF GROUND SQUIRRELS.

Operations were continued in 10 counties with reduced personnel until October 1, 1921, when these activities were concentrated in 4 counties, San Francisco, San Mateo, Alameda, and Contra Costa, as it was believed the most beneficial results could be obtained, under the limited appropriation available, by intensive work around the bay cities in an effort to create a comparatively squirrel-free zone adjacent to these cities and thereby lessen the danger of transmission of plague from the squirrels to the rats in these larger centers of commercial activity. Very satisfactory results have been accomplished, especially in the country bordering on the city of Oakland, and in the outlying portions of this city.

Cordial and cooperative relations have been maintained with the State board of health and the county horticultural commissioners, and these agents and others fully realize the importance of squirrel eradication both from an economic standpoint and prevention of spread of infection.

The following tabulated statement presents the field operations:

Number inspections.....	701
Number reinspections.....	4, 419
Number acres inspected.....	208, 765
Number acres reinspected.....	1, 506, 452
Number acres treated with waste balls.....	88, 916
Number acres treated with grain.....	387, 364
Number acres treated with destructors.....	25
Number acres treated with hose and funnel.....	5
Number holes treated.....	655, 513

Special work in city of Oakland.

Number acres treated with carbon bisulphide.....	902
Number holes treated with waste balls.....	8, 220
Number acres covered with poisoned grain.....	992

Material used.

Number pounds poisoned grain.....	155, 922
Number gallons carbon bisulphide.....	10, 397
Number waste balls used.....	655, 513

Poisoned barley mixed for private landowners under supervision of employees of service.

Number pounds.....	42, 433
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Laboratory work in connection with field operations.

Number rats received and examined:

City of San Francisco.....	2, 854
From fumigated ships.....	2, 011
City of Berkeley.....	2, 525
City of Oakland.....	97
San Benito County.....	1

Total.....	7, 543
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Number of mice received and examined:

City of San Francisco.....	43
City of Berkeley.....	362

Total.....	405
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Number of squirrels received and examined.....	63
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Number of rabbits received and examined.....	35
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Number found infected.....	0
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Sanitary inspections performed in the city of San Francisco on complaints referred from city health department and from other sources.

Rat complaints.....	484
Manure and stable complaints.....	60
Chicken, rabbit, pigeon, etc., complaints.....	364
Garbage and defective garbage cans.....	69
Rubbish complaints.....	32
Plumbing complaints.....	6
Insanitary premises, including shacks.....	302
Stench complaints.....	104
Goat, dog, and cat complaints.....	50
Mosquito, fly, and flea complaints.....	46
Swine complaints.....	16
Plumbing complaints, referred to board of health.....	32
Lots from which stagnant water has been pumped.....	5
Miscellaneous.....	66

Total.....	1, 636
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NOTE.—All the above complaints were investigated by the inspectors, the necessary notices prepared and sent out, and reinspections made to determine whether the existing nuisance were abated.

Measures taken against rats.

Number of premises inspected.....	18, 719
Number of nuisance abated.....	2, 940
Number of complaints investigated.....	1, 599
Number of garbage cans installed.....	1, 490
Number of chicken yards abandoned.....	182
Number of chickens, pigeons, rabbits, etc., disposed of.....	2, 195
Number of vacant lots cleaned.....	39
Number of basements cleaned.....	297
Number of yards cleaned.....	26
Number of premises cleaned of rubbish.....	115

Measures taken for the destruction of rat harbors.

Number of floors torn up.....	187
Number of basements torn up.....	52
Number of yards torn up.....	96
Number of buildings destroyed.....	164
Number of stables destroyed.....	18

Measures taken for the permanent rat proofing of old buildings, including food places.

Number of buildings rat-proofed by concreting.....	344
Basements concreted (square feet, 39,900).....	35
Floors concreted (square feet, 400,434).....	294
Yards, passageways, sidewalks, etc., concreted (square feet, 17,275).....	44
Total area concrete laid.....square feet..	457, 609
Number of area walls installed (cubic feet, 38,711).....	111
Number of floors rat-proofed with double floors and wire cloth between (square feet, 28,720).....	23
Lens lights replaced.....	2, 284
Openings in walls, ceilings and floors, and around pipes closed by wire cloth and cement.....	7, 563

Condemnation proceedings.

Number of buildings submitted to board of health for condemnation.....	113
Number of buildings acted on by board of health and condemned.....	94
Number of buildings acted on by board of health and not condemned.....	50
² Number of buildings abated following condemnation proceedings: By repair, 25; by demolition, 90.....	115
Number of buildings condemned and remaining unabated.....	53

OPERATIONS OF THE FEDERAL LABORATORY.

A résumé of the work of the laboratory follows:

Blood for Wassermann reaction.

United States Marine Hospital:	
Port Townsend, Wash.....	2
San Francisco.....	2, 393
United States Public Health Service Hospital, Arrowhead Springs, Calif....	3
United States Public Health Service Station, Los Angeles, Calif.....	137
United States Veterans' Bureau:	
San Francisco, Calif.....	387
Los Angeles, Calif.....	89
San Jose, Calif.....	12
San Luis Obispo, Calif.....	4
United States revenue cutter <i>Bear</i>	1
Indian Service, Tucson, Ariz.....	1
United States Indian Service Hospital, Sells, Ariz.....	1

Cerebrospinal fluid for Wassermann reaction.

United States Marine Hospital, San Francisco.....	21
United States Public Health Service Station, Los Angeles, Calif.....	2
Blood culture for <i>B. typhosus</i> (United States Marine Hospital, San Francisco).....	20
Urine for <i>B. typhosus</i> (United States Marine Hospital, San Francisco).....	50
Feces for <i>B. typhosus</i> (United States Marine Hospital, San Francisco).....	27
Guinea pig inoculation for tuberculosis (United States Marine Hospital, San Francisco).....	28
Knee joint.....	1
Pleural fluid.....	1
Pus from chest tumor.....	1

² These include some buildings condemned during previous years, hence totals will not balance.

Guinea pig inoculation for tuberculosis, etc.—Continued.

Pus.....	3	
Sputum.....	19	
Urine.....	2	
Spinal fluid.....	1	
United States Veterans' Bureau (San Luis Obispo).....		8
Sputum.....		8
United States Veterans' Bureau (San Francisco).....		1
Sputum.....		1
Widal reaction (United States Marine Hospital, San Francisco).....		19
Cerebrospinal fluid for meningococci (United States Marine Hospital, San Francisco).....		6
Cerebrospinal fluid for Noguchi butyric acid test (United States Marine Hospital, San Francisco).....		3
Autogenous vaccine.....		39
United States Marine Hospital, San Francisco.....	12	
United States Veterans' Bureau, San Francisco.....	27	
Tissue for histological examination.....		318
United States Marine Hospital, San Francisco.....	315	
United States Marine Hospital, Eureka.....	3	
Feces for animal parasites.....		205
City and County Hospital, San Francisco (human feces)....	195	
City and county pound, San Francisco (dog feces).....	10	
Feces for intestinal parasites (United States Marine Hospital, San Francisco).....		4
Feces for <i>B. dysentery</i> (United States Marine Hospital, San Francisco).....		3
Feces for occult blood (United States Veterans' Bureau, San Luis Obispo).....		2
Spleen and gland for human plague (Contra Costa County).....		1
Sputum for Actinomyces (United States Marine Hospital, San Francisco)....		1
Precipitant test for echinococcus (United States Marine Hospital, San Francisco).....		1
Sterility test (United States Marine Hospital, San Francisco).....		58
Kangaroo tendons.....	2	
Kangaroo gut.....	3	
Catgut.....	52	
Gutta percha.....	1	
Bacteriological examination of water.....		9
United States Veterans' Bureau.....	1	
United States Marine Hospital, San Francisco.....	8	
Bloody fluid for bacteriological growth (United States Marine Hospital, San Francisco).....		1

RAT SURVEY IN NEW ENGLAND SEACOAST CITIES.

From July 1 to November 28, 1921, Passed Asst. Surg. L. L. Williams, jr., cooperated with the New England State health departments and with the city health departments of seaports in these States in regard to rat-trapping operations and plague-preventive measures. Upon the transfer of Doctor Williams to other work the duties of continuing service activities in the preparation of New England ports against plague infection were assigned to Associate Sanitary Engineer Sol Pincus in connection with other functions of interstate sanitary district No. 1. Prior to this, the New England Committee on Plague Prevention and Rodent Control was organized as a result of the meeting of representatives of civic and commercial groups at Boston in June, 1921.

Two well-attended meetings of this committee were held in Boston on January 10 and June 15, 1922. The world situation relative to plague prevalence and the various activities of the Public Health Service for the protection of this country from infection were presented to the members. Earnest consideration was given by the representatives present to local measures that might be inaugurated

for safeguarding seaports from the dangers of plague. Resolutions were adopted at the meeting on January 10 urging the importance of local anti-plague measures supplementing the Federal activities and assuring the cooperation of the interests represented on the committee. Efforts were later made by members of this committee to secure the establishment of local plague-preventive measures in various New England States and seaport cities.

The service has been able to give extensive assistance during the year to local authorities in the undertaking of rat surveys. Besides the general supervision and advisory services of the district sanitary engineers, the services of a technician and bacteriologist expert in making examinations for rodent plague and of a foreman experienced in training a squad of rat catchers were furnished to health authorities when such assistance was requested. A special laboratory for rodent examinations is being equipped and opened by the service in July, 1922, at the United States quarantine station, Gallops Island, Boston. Facilities for thorough examination of rodents for plague and other rat-borne diseases will then be available to all seaports in New England through the shipment of captured rodents to this laboratory.

The objects of the service in connection with these plague-preventive activities is: (1) To determine the existence or absence of rodent plague infection; (2) to determine the reasons for possible immunity if no rodent plague infection is found; (3) to determine the effectiveness of present quarantine measures in preventing the introduction of plague into this country; and (4) to establish a nucleus organization to effectively prevent an outbreak of plague in this region.

RAT SURVEY IN PORTLAND, ME.

A rat survey in Portland, Me., was carried out by the city health department from November, 1921, to February 15, 1922, to determine whether rodent plague existed in the port. A total of 2,450 rodents were examined. No plague infection was detected. It is now being planned by the local health officer to have rodent trapping and examinations resumed in that port.

RAT SURVEY IN BOSTON, MASS.

Following the preliminary rodent survey in Boston made jointly by the State health department and the Public Health Service, the Boston city health department continued the campaign and has maintained a local trapping force continuously. Considerable assistance was given the local department by making available for several months the services of Acting Asst. Surg. Paul Eaton, an expert technician in rodent examination, and of Foreman Trapper J. Sisk. A total rodent catch of over 7,000 rats and mice was examined. No plague infection was found. It is expected that this work will be actively continued.

RAT SURVEY AT NEW BEDFORD, MASS.

Assistance was given the local health authorities of New Bedford Mass., in carrying on the rodent survey inaugurated in that seaport in January, 1922. To the end of June approximately 2,000 rodents

were captured and examined, with no evidence of plague infection. Acting Asst. Surg. Paul Eaton and Foreman Trapper J. Sisk were detailed to New Bedford for a short period to advise and assist the local forces.

RAT SURVEY IN NEW YORK CITY.

Following conferences with the service, January, 1922, the health department of New York City resumed the rat survey on the water front which had been discontinued early in 1921. An average of about 35 trappers were regularly employed along the extensive water front of the various boroughs of the city. The service engineers were frequently called upon to advise concerning the conduct of the rodent survey and to make recommendations for improvements. The services of Foreman Trapper J. Sisk were furnished the city health department for two months to instruct the local trappers in effective methods for capturing the rodents. A total of 8,639 rodents were trapped to June 30 with no indication of plague infection upon examination.

PREVENTING THE SPREAD OF COMMUNICABLE DISEASES.

As in previous years, assistance has been rendered State health departments as far as possible in developing divisions of communicable diseases and in bringing them to a high plane of effectiveness, such efforts being based on the fact that the most effective and most economical means of preventing the spread of disease from one State to another at the disposal of the Federal Government lies in the development and utilization of strong State health departments. [During the past fiscal year, limited funds permitted such assistance in only two States, Wisconsin and Louisiana.]

WISCONSIN.

Surg. Robert Olesen continued as epidemiologic aid to the Wisconsin State Board of Health from July 1, 1921, to May 8, 1922, at which date he was assigned to duty in the State of North Dakota for studies in public health administration. The assignment as epidemiologic aid was originally made for the purposes of establishing endemic indices for the reportable diseases. While it was possible to prepare helpful indices it was soon realized that these were only approximately accurate and that their value could be materially enhanced by improving morbidity registration. From this activity it was a logical step to organize a bureau of communicable diseases in the State board of health for the collection and study of the statistics obtained.

The work in Wisconsin may be considered under three heads, namely, administrative, educational, and investigative.

ADMINISTRATIVE ACTIVITIES.

Organization of bureau of communicable diseases.—The outstanding feature of the detail in Wisconsin was the establishment of the bureau of communicable diseases. During the preceding year the ground-

work for this new departure in the work of the State board of health was carefully laid through educational means, resulting in the appropriation of a sum sufficient to initiate the work. The service representative served as acting director of this bureau from its inception until his detail to North Dakota. Under his supervision this bureau developed into a functioning department with seven field workers and five clerks. The bureau of venereal diseases, previously operating as a separate unit, was combined with the bureau of communicable diseases.

Supervision over local health officers.—Previous experience with the 1,741 local health jurisdictions of the State was useful in outlining plans whereby the efficiency of local health officers might be increased. By means of a simple questionnaire the qualifications of appointees were determined and the material needs of the incumbents were quickly and accurately filled. The largest number of bona fide and qualified health officers yet recorded by the State board of health resulted from the efforts put forth during the past year.

In many local health jurisdictions it has been the practice to name members of local boards merely as a matter of form and in compliance with the law. In an effort to bring about improvement each person mentioned as having been appointed was officially notified of appointment and urged to take an active interest in the public health affairs of the community. The appointment of women as local health officers and as members of local boards was strongly urged, the result being the selection of a number of such officials, who rendered satisfactory service.

Steady pressure was exerted, through correspondence and personal interviews, upon officials who were slow or delinquent in rendering reports or in discharging the duties of their office. The foregoing measures have resulted in a notable improvement in the performance of public health duties throughout the State.

Improvement in morbidity registration.—The efforts to improve morbidity registration in Wisconsin have been followed by increasingly satisfactory results. Insistence upon regular weekly reports from all local health officers, even when no cases have occurred, has resulted in an increase of measureable proportions. These results have been obtained through constant follow-up work and the education of officials to the usefulness of accurate information of this character.

Utilization of morbidity reports.—Merely to collect morbidity reports without utilizing the valuable information presented is inexcusable. It is a frequent complaint that no use is made of the reports that are prepared and submitted by physicians, frequently at considerable inconvenience. In Wisconsin, however, this complaint is untenable. In addition to submitting the usual weekly, monthly, and yearly reports to the Public Health Service, the bureau of communicable diseases has inaugurated an extensive weekly service for deputy State health officers, epidemiologists, county public health nurses, State health departments of adjoining States, and the commissioner of health of Milwaukee. By means of weekly reports these health officials are in receipt of information which enable intelligent combative effort. It has also been found that the weekly reports frequently serve as checks against unreported cases in a community.

In addition to transmitting regular morbidity reports to health officials throughout the State, communicable-disease summaries are reproduced at frequent intervals in the newspapers, thereby focusing the attention of the people upon unusual outbreaks of disease. Compilation and study of all available material was continued during the year, with corresponding benefit in applying the principles of public health protection.

Uniform quarantine signs and placards.—The diversity in size, shape, color, and lettering of quarantine signs and placards is well known to persons who have occasion to visit various communities in the same State. This condition formerly prevailed in Wisconsin. During the past year, however, quarantine signs and placards of uniform size, color, and lettering have been sold at actual cost to local health officers, thereby correcting a condition that had been highly unsatisfactory in the past. The response of local officials to this plan has been prompt and pleasing, largely because of the saving effected to the local communities. Approximately 60,000 quarantine signs and placards have already been sold by the State board of health.

Diphtheria death investigations.—The studies initiated during the previous year, which had for their purpose the fixing of responsibility for diphtheria deaths, were continued. Much valuable information has been adduced as a result of these studies and the findings will shortly be available for publication.

Typhoid fever case card.—A special form for recording the data obtained during the investigation of typhoid fever cases was prepared, printed, and distributed to the epidemiologists, deputies, and sanitary engineers. This card embodies several new features and has proved useful in stimulating interest in the important work of investigating cases of typhoid fever.

Typhoid fever in highway construction camps.—During the summer of 1921 there were several severe outbreaks of typhoid fever in highway construction camps in Wisconsin. Upon investigation it was found that sanitation in many of the camps was entirely lacking and that there existed unusual opportunities for the spread of infection to the civilian population. In combating the tendency of contractors to ignore sanitary requirements, use was made on the workman's compensation act which, in Wisconsin, includes sickness incident to employment. The filing of claims by a number of workmen who had contracted typhoid fever was instrumental in directing the attention of contractors to the necessity for exercising the greatest possible care in safeguarding the health of their employees.

EDUCATIONAL ACTIVITIES.

In the final analysis the prevention and control of communicable disease resolves itself very largely into the preparation of the lay mind for recognizing its share of responsibility. Until every man, woman, and child realizes that public health is largely a matter of individual responsibility and not one that can be controlled by public officials alone, the real goal will not have been reached. With this in mind earnest efforts were made to encourage educational work among the general public.

Visualization of communicable disease records.—Through the use of thermometer like devices the prevalence of the various communicable disease in the State was shown from day to day. There are

few who can pass these "indicometers" without stopping to note the latest developments in the communicable disease situation. With excellent morbidity reports available it was possible to maintain creditable daily checks upon the incidence of communicable disease. Timely State-wide publicity, the arousing of interest on the part of local officials and citizens, the dispatching of epidemiologists and deputies into the field, and the acquisition of vaccine and antitoxin of ample quantity are some of the more important activities given intelligent guidance by this system.

Publication of the "Communicator."—Appreciating the need for a means of current communication between the bureau of communicable diseases and members of the staff engaged in communicable disease work a weekly publication was founded and edited. Altogether 34 numbers of this publication were prepared and issued. In this news letter, known as "The Communicator," were discussed advances in communicable disease control, State and local health problems, current disease prevalence, and correlated activities of other departments of the board. In every way possible service was emphasized and efforts were put forth to weld together a compact and efficient organization.

When the service representative was relieved from duty in Wisconsin "The Communicator" was increased in size in order that all divisions of the board might be included. Publication is now being continued along the lines originally laid down.

Stereopticon lecture.—The presentation of figures or statistics to a lay audience or the mere recital of facts seldom makes a lasting impression unless the speaker is unusually gifted. Inasmuch as there are usually only a few talented lecturers attached to a board of health, while the need for presenting health subjects to the people is ever present, it appeared that a stereopticon lecture might prove useful. Consequently, a series of 50 original lantern slides were prepared with the assistance of the artist of the State board of health. These slides, collectively depicting "The Prevention and Control of Communicable Diseases," consist of original illustrations, logically presenting the steps involved in dealing with the maladies in question. It has been suggested to those who use the slides that the pictures will tell their own story. However, certain features may require verbal elaboration and the lecturer may use his own judgment as to the nature of the exposition.

Notification of local health officers of laboratory findings.—Many physicians are prone to forego or neglect to report cases of communicable diseases coming to their attention. To correct this omission advantage has been taken of positive laboratory findings in tuberculosis, diphtheria, gonorrhea, and typhoid fever. By means of daily laboratory reports local health officers are notified of the fact when a positive finding has been recorded in the practice of a designated physician. If the case has not already been reported to the local health officer, a means is provided whereby the necessary public health control may be inaugurated. An opportunity for reminding the offending physician of his responsibilities is also afforded.

Cancer campaign.—The Wisconsin State Board of Health, like other State organizations, played an active part in the national educational campaign against cancer. The service representative took part in the work by preparing a number of news stories, graphs of

cancer death rates, participated in the speaking campaign, and advised as to the general conduct of the organized endeavor.

Preparation of new communicable disease pamphlet.—The necessity for publishing a supply of pamphlets containing the rules and regulations for the prevention and control of communicable diseases afforded an opportunity for revising thoroughly, rearranging the contents, and bringing up to date this most popular publication of the board.

Preparation of communicable disease chart for schools.—The demand for a competent guide which might prove useful for teachers, parents, and other lay persons in the early determination of communicable diseases in schools culminated in the preparation of a chart intended for display in schoolrooms. Both sides of this chart are utilized for the dissemination of information and when not in use it may be folded.

Articles for Wisconsin State Medical Journal.—The service representative endeavored to keep the subject of morbidity registration before the medical profession by occasional articles in the official organ of the State medical society. Four articles and one editorial were prepared.

Diphtheria culture taking.—The failure of many physicians to take nose and throat cultures in suspicious cases is too well known to require extended comment. Moreover, many practitioners fail to secure necessary culture releases, thereby permitting carriers to spread diphtheria. In checking up the laboratory records in Wisconsin it was found that routine culture taking, especially as defined by the regulations of the State board of health, was rapidly becoming a lost art, obviously to the detriment of the public health.

With a view to overcoming this dangerous tendency a circular letter was sent to all physicians and local health officers in the State, calling attention to the increase in diphtheria and the obvious means of mitigating the menace. At the bottom of the page of the circular letter was a coupon which was to be signed and returned to the board as evidence of an understanding of the requirements. As a result of this letter the work in the laboratories increased tremendously, necessitating the employment of additional personnel and culminating in the discovery of many diphtheria patients and carriers who otherwise would have escaped adequate treatment or control.

Case records and letter to physicians.—Interest in the prevention and control of venereal diseases must be stimulated constantly in order to avoid a disastrous lapse into indifference. A series of 10 venereal-disease case records, accompanied by circular letters of unique design and dispatched at fortnightly intervals to each of the 2,700 physicians of Wisconsin, brought notable results. With each letter was sent a coupon which, if filled out and returned would bring a different publication dealing with some phase of venereal disease control. The response to these letters was prompt, large, and appreciative. Many physicians expressed their appreciation of the efforts to enlighten them and their patients. For each publication offered hundreds of requests were forthcoming from physicians. In one instance over 800 requests, representing approximately one-third of the physicians in the State, were received for a single publication.

Exhibit for State medical association in Milwaukee.—The matter of providing an exhibit that will catch the eye of the physician at a

medical meeting is one requiring considerable study and preparation. Such an exhibit was prepared for the annual meeting of the State medical society in Milwaukee. In addition to displaying the publications available for distribution and illustrating the services rendered by the laboratories, each of the deputy State health officers and epidemiologists were present to explain how they could be of service to the physicians in their districts. Moreover, large maps of these districts were included in the exhibit so that practitioners could easily locate their deputies. An "attractoscope" displaying slides of the activities of the State board of health completed the exhibit.

Health officer's record card.—Many local health officers fail to keep records of the communicable diseases coming under their supervision, particularly in the smaller communities. In this way public health control is made a slipshod procedure rather than a definite and intelligent requirement. Several health officers, feeling the need for some simple method of keeping adequate records, wrote to the bureau and requested that a simple card form be devised. Consequently such a card was prepared and a sample sent to each health officer for criticism. As a result of the experience gained in this way it has been possible to advise the use of a card that will materially enhance not only the record keeping but also the more effective material control of communicable diseases.

Special bulletin on goiter prophylaxis.—The considerable prevalence of goiter in Wisconsin and the unusual opportunity for effective prophylaxis, as outlined by Marine and Kimball, was made the occasion for the publication of a special bulletin dealing with the subject. In addition to publishing the article in the State Medical Journal and Quarterly Bulletin of the board, State-wide newspaper articles were sent out. Upon request a reprint of the article was sent to all persons. The response to this article was large.

Graphic representations of preventable disease death rates.—For the benefit of members of the staff of the State board of health, county public health nurses, and the health officers of the principal cities, a series of graphs showing the annual death rates from certain preventable diseases were prepared and published as blue prints. These graphs covered a 10-year period in the State and were instrumental in visualizing the needs in the campaigning against preventable diseases.

Preparation of illustrations for sex hygiene lecturer.—For the purpose of providing one of the sex-hygiene lecturers with material for a stereopticon lecture considerable time was spent in directing the artist of the board in the preparation of suitable drawings from which lantern slides could be made.

State-wide news stories.—In order to give warning to the people of the State of unusual disease prevalence a number of news stories were written for State-wide publication. Special articles on whooping cough and infantile paralysis were presented at opportune times.

Lectures, talks, and conferences.—During the past year all employees of the board have been encouraged to increase their educational efforts. Outlines for talks and lectures, together with other useful information, were sent out at frequent intervals. More lectures and talks were given by members of the staff during the year than during any similar period for which a record is available. Newspaper publicity also increased perceptibly. At all times there were more demands for speakers than the board could meet.

The service representative participated in the speaking campaign, delivering addresses before 24 assemblages in this State.

LOUISIANA.

Surg. C. L. Williams, epidemiologic aide to the State Board of Health of Louisiana, who had been detached for special temporary duty in the plague laboratory at New Orleans, resumed his activities with the State board of health in January, 1922. A survey of epidemiological conditions throughout the State was inaugurated and is now under way. Vigorous efforts are being made to secure accurate and complete reporting of communicable diseases. This entails personal visits to delinquent physicians, which visits are made when possible in connection with investigations of unusual prevalence or unusual cases of disease in their respective territory, thus securing the opportunity of demonstration in their own practices of the necessity and reasons for reporting communicable diseases to the proper health authorities.

An endemic index is in process of preparation, utilizing death records which are accurate for the past five years. It is proposed to prepare endemic indices for the State, the various parishes, and the principal cities.

Several investigations of small outbreaks of disease, principally typhoid fever and smallpox, have been made. Throughout the State there appears to be a fast-growing confidence in antityphoid vaccination among both physicians and laity. Vaccine is furnished by the State board of health and its use is rapidly increasing.

In the latter part of April the high waters of the Mississippi broke through the levees in four places in Louisiana, overflowing all or parts of 10 or more parishes. Surprisingly little increase in communicable disease can be ascribed to the flood, but the interesting observation was made that there was a distinct increase in dysentery, and malaria in those parts of the overflowed area, the population of which was concentrated in refugee camps. Immediately upon subsidence of the flood, Doctor Williams, on orders from the Surgeon General, cooperated with the state board of health and the State flood relief committee in instituting sanitary relief measures where these were needed. In the refugee camps a large portion of the flood area population was vaccinated by local health officials against typhoid fever. This is being augmented by vaccination of persons not reached in the camps. In addition, all overflowed wells and cisterns are being chlorinated and quinine distributed to known malaria carriers.

CONTROL OF INTERSTATE WATER SUPPLIES.

During the past fiscal year the control of water supplies used by common carriers for drinking and culinary purposes in interstate traffic has been carried out in cooperation with the State health departments in accordance with the policy of utilizing existing State health organizations to the fullest extent. Where a State sanitary engineering division does not exist or is inadequate, service assistance has been rendered as far as possible with the twofold object of instituting and developing such divisions in State health departments and of making inspections and analyses of interstate carrier water supplies

to obtain the necessary data for certification. Through the establishment of interstate sanitary districts of the service and the assignment of service sanitary engineers in charge of each, a closer contact has been established with each State health department, and a more thorough supervision has been instituted over interstate carrier waters, the methods of handling at terminals and stations, and the sanitary conditions on interstate common carriers. The cooperative certification policy as adopted at the conference of State and Territorial health officers on June 4, 1919, and modified at the meeting on June 4, 1921, has been carried out with marked increase in effectiveness of supervision over interstate carrier waters and improvements in sanitary quality and safety of such water supplies.

In the first week in January, 1922, a conference of all district engineers in charge of interstate sanitary districts of the Public Health Service was held at the bureau, and the policy concerning interstate carrier (railroad and vessel) water supervision and cooperation with State health departments in developing their divisions of sanitary engineering was considered. As a result, this work during the last half of the fiscal year has increased greatly in scope and effectiveness, although the same amount of money was available as for the same period during the preceding fiscal year.

ADVISORY COMMITTEE ON OFFICIAL WATER STANDARDS.

In order to provide for more effective administration of the interstate quarantine regulations of the United States, as they relate to drinking water provided on interstate common carriers, a committee known as the advisory committee on official water standards has been appointed by the Surgeon General, with the approval of the Secretary of the Treasury, to review the present Treasury Department standard for drinking water on interstate common carriers and to recommend a standard or standards based on recommended specific methods of laboratory analysis and field survey which will be applicable to all classes of water supplies coming within the supervision of the interstate quarantine regulations of the United States. The committee is to recommend advisable methods of laboratory analysis and field survey and a reasonable basis of judging the sanitary quality and safety of a water. In view of the fact that such a standard or standards will be used widely, certain Federal bureaus, national scientific societies concerned with water supply, and associations of State health officials and common carriers have been invited to designate representatives on this committee, and prominent waterworks operators and sanitarians have been invited to become members.

MEMBERS OF ADVISORY COMMITTEE ON OFFICIAL WATER STANDARDS.

Representatives of Federal organizations.

Agriculture Department.—W. W. Skinner, Assistant Chief, Bureau of Chemistry, Washington, D. C.

Commerce Department.—H. S. Davis, fish pathologist, Bureau of Fisheries, Washington, D. C.; F. W. Smither, chemist, Bureau of Standards, Washington, D. C.

Interior Department.—W. D. Collins, chief, quality of water division, United States Geological Survey, Washington, D. C.

Navy Department.—Charles S. J. Butler, commander, Naval Medical School, Washington, D. C.

Public Health Service.—W. H. Frost, surgeon, Johns Hopkins University, Baltimore, Md.; George W. McCoy, Director Hygienic Laboratory, Washington, D. C.; A. J. McLaughlin, Assistant Surgeon General, Washington, D. C.; Sol Pincus, associate sanitary engineer, 116 Customhouse, New York City; R. E. Tarbett, sanitary engineer, Third and Kilgour Streets, Cincinnati, Ohio; E. Sydenstricker, statistician, Washington, D. C.

War Department.—A. P. Hitchens, major, Army Medical School, Washington, D. C.

Representatives of scientific associations.

American Chemical Society.—Lewis I. Birdsall, superintendent of filtration, St. Anthony Falls Station, Minneapolis, Minn.

American Medical Association.—Victor C. Vaughan, chairman, division of medical sciences, National Research Council, 1701 Massachusetts Avenue, Washington, D. C.

American Public Health Association.—William H. Park, director of research laboratories, city department of health, New York City.

American Railway Association.—Thomas R. Crowder, chief surgeon, Pullman Co., Chicago, Ill.

American Society of Civil Engineers.—George C. Whipple, president, the engineering school, Harvard University, Cambridge, Mass.

American Society for Municipal Improvements.—Morris R. Sherrerd, consulting engineer, department of streets and public improvements, city hall, Newark, N. J.

American Water Works Association.—A. W. Freeman, resident lecturer, Johns Hopkins University, Baltimore, Md.

Association of Official Agricultural Chemists.—J. W. Sale, chemist, Bureau of Chemistry, Washington, D. C.

Conference of State and Provincial Health Authorities.—S. W. Welch, State health officer, Montgomery, Ala.

Conference of State Sanitary Engineers.—C. A. Emerson, chief engineer, State department of health, Harrisburg, Pa.

Society of American Bacteriologists.—W. H. Frost, surgeon, Public Health Service, Johns Hopkins University, Baltimore, Md.

Sanitarians.

Edward Bartow, professor of chemistry, State University of Iowa, Iowa City, Iowa.

H. W. Clark, director, division of water and sewage laboratories, State department of public health, Boston, Mass.

W. H. Dittoe, chief engineer, State department of health, Columbus, Ohio.

George G. Earl, general superintendent, sewerage and water board, New Orleans, La.

J. W. Ellms, consulting engineer, Frazier-Ellms Sheal Co., Illuminating Building, Cleveland, Ohio.

George W. Fuller, consulting engineer, 170 Broadway, New York City.

J. J. Hinman, associate professor of sanitation, State University of Iowa, Iowa City, Iowa.

Charles G. Hyde, professor of sanitary engineering, University of California, Berkeley, Calif.

Edwin O. Jordan, professor of bacteriology, University of Chicago, Chicago, Ill.

H. E. Jordan, superintendent of filtration, 113 Monument Circle, Indianapolis, Ind.

Roger G. Perkins, professor of hygiene and preventive medicine, Western Reserve University, Cleveland, Ohio.

Lowell J. Reed, associate professor of vital statistics, Johns Hopkins University, Baltimore, Md.

Milton J. Rosenau, professor of preventive medicine and hygiene, Harvard University, Cambridge, Mass.

Milton F. Stein, civil engineer, 6753 Lafayette Avenue, Chicago, Ill.

William Firth Wells, biologist and sanitarian, New York Conservation Commission, Albany, N. Y.

Robert Spurr Weston, consulting engineer, 14 Beacon Street, Boston, Mass.

H. A. Whittaker, director, division of sanitation, State board of health, Minneapolis, Minn.

C. E.-A. Winslow, professor of public health, Yale University, New Haven, Conn.

Abel Wolman, division engineer, State department of health, Baltimore, Md.

C. C. Young, director, bureau of laboratories, State department of health, Lansing, Mich.

RAILROAD WATER SUPPLIES.

The following table summarizes by States, data concerning the certification of railroad interstate carrier waters during the fiscal year ending June 30, 1922:

RAILROADS.

Interstate carrier waters.

State.	Sources.				Certified.				Per cent sources certified.
	Public.	Private.	Railroad.	Total.	Satisfactory.	Poluted.	Provisional.	Delinquent.	
Alabama.....	33	6	7	46	14	2	0	30	35
Arizona.....	23	11	19	53	0	0	0	53	0
Arkansas.....	44	13	24	81	30	0	10	41	50
California.....	45	24	25	94	49	2	5	38	60
Colorado.....	24	10	10	44	0	0	0	44	0
Connecticut.....	23	1	3	27	18	0	0	9	67
Delaware.....	5	0	1	6	0	1	0	5	17
District of Columbia.....	1	0	0	1	1	0	0	0	100
Florida.....	43	13	12	68	41	0	0	27	60
Georgia.....	69	7	7	83	63	6	2	12	86
Idaho.....	25	4	14	43	18	4	3	18	58
Illinois.....	75	18	25	118	40	6	8	64	46
Indiana.....	52	8	8	68	48	4	1	15	78
Iowa.....	57	12	27	96	43	7	1	45	53
Kansas.....	71	7	22	100	41	2	0	57	43
Kentucky.....	27	8	11	46	20	0	0	26	43
Louisiana.....	35	16	23	74	43	4	0	27	64
Maine.....	27	7	9	43	1	0	0	42	2
Maryland.....	12	2	9	23	12	0	0	11	52
Massachusetts.....	39	0	1	40	40	0	0	0	100
Michigan.....	72	19	35	126	88	0	1	37	70
Minnesota.....	43	15	32	90	59	8	0	23	74
Mississippi.....	34	12	10	56	36	2	0	18	68
Missouri.....	45	12	27	84	0	0	0	84	0
Montana.....	21	3	10	34	24	0	0	10	70
Nebraska.....	33	3	32	68	49	8	4	7	90
Nevada.....	8	1	10	19	2	0	0	17	11
New Hampshire.....	16	2	4	22	15	3	4	0	100
New Jersey.....	44	3	8	55	52	3	0	0	100
New Mexico.....	12	2	18	32	22	0	0	10	70
New York.....	103	10	16	129	49	6	7	67	48
North Carolina.....	46	18	11	75	42	1	3	29	61
North Dakota.....	12	2	12	26	2	0	0	24	8
Ohio.....	78	10	18	106	80	4	0	13	88
Oklahoma.....	46	11	19	76	12	8	1	55	28
Oregon.....	40	6	11	57	30	4	0	23	60
Pennsylvania.....	116	23	21	160	62	5	1	92	43
Rhode Island.....	3	0	4	7	7	0	0	0	100
South Carolina.....	39	7	3	49	21	0	2	26	47
South Dakota.....	21	0	14	35	8	0	0	27	23
Tennessee.....	25	10	16	51	25	2	0	24	53
Texas.....	101	14	60	175	29	1	0	135	17
Utah.....	7	5	5	17	0	0	0	17	0
Vermont.....	17	12	0	29	0	1	1	27	7
Virginia.....	44	6	6	56	40	0	1	15	73
Washington.....	35	7	28	70	29	6	1	34	50
West Virginia.....	25	16	20	61	42	7	2	10	84
Wisconsin.....	48	15	24	87	6	1	0	80	8
Wyoming.....	16	1	7	24	17	0	2	5	80
Total.....	1,880	412	738	3,030	1,379	108	60	1,483	51

Under the cooperative certification procedure as adopted at the 1921 conference of State and Territorial health officers, inspections and examinations of the water supplies are made by State department of health officials before water supplies are certified by the United States Public Health Service. This procedure gives a more rigorous supervision over the sanitary quality and safety of interstate water supplies than in the past, yet 51 per cent of the railroad water supplies were certified in the past fiscal year after its institution. In comparison with the certification status of railroad water supplies during the fiscal year ending June 30, 1921, the following points are noted:

1. The total number of supplies is about the same, the difference being due to the small decrease in public supplies during the past fiscal year.

2. The number of satisfactory water supplies has increased by 6 per cent.

3. The number of polluted water supplies has decreased by 25 per cent.

4. The number of provisional supplies has decreased by 82 per cent.

5. The number of supplies uncertified has increased by 13 per cent.

Lack of personnel and funds has delayed the certification of the 49 per cent of railroad interstate carrier water supplies.

The efforts to obtain more complete and reliable information as to the railroad water supplies used have been continued and have produced a large amount of valuable data. Through the cooperation of the American Railway Association an effort is being made to have the railroads obtain their water for drinking and culinary purposes in interstate traffic from regular watering points, and as few watering points as possible.

Through the cooperation of the American Railway Association the car-building companies are being informed concerning sanitary water-cooler installations, so that such installations may be made when cars are constructed. In addition, matters concerning the sanitary features of terminals, stations, and coach yards, such as handling of drinking water, filling of coolers, etc., are now under investigation.

VESSEL INTERSTATE WATER SUPPLIES.

From the institution of the supervision over water supplies and water-supply systems furnishing drinking, cooking, and washing water aboard vessels on an extensive scale in the last few months of the preceding fiscal year, this work has increased in magnitude and effectiveness so that on the Great Lakes, the Mississippi and Ohio Rivers and their tributaries, the Atlantic, Gulf, and Pacific coasts, and on other inland bodies of water vessels, operating in interstate traffic are being inspected to insure use of a safe water supply aboard for such purposes. The cooperation of the State departments of health has been obtained in certifying water supplies ashore from which water is taken for use aboard vessels. The following table summarizes by States data concerning the certification of vessel interstate carrier waters during the fiscal year ending June 30, 1922:

VESSELS.

Interstate carrier waters.

State.	Sources.				Certified.				Per cent sources certified.
	Public.	Private.	Company.	Total.	Satisfactory.	Pol-luted.	Provi-sional.	Delin-quent.	
Alabama.....	2	1	0	3	2	0	0	1	67
Arizona.....									
Arkansas.....	1	0	0	1	0	0	0	1	0
California.....	19	4	2	25	3	0	0	22	12
Colorado.....									
Connecticut.....	5	1	0	6	0	0	0	6	0
Delaware.....	3	0	0	3	0	0	0	3	0
District of Columbia.....	1	0	0	1	1	0	0	0	100
Florida.....	16	3	2	21	4	0	0	17	19
Georgia.....	6	0	0	6	0	0	0	6	0
Idaho.....	2	1	0	3	0	0	0	3	0
Illinois.....	6	1	0	7	1	0	0	6	14
Indiana.....	5	2	0	7	3	1	0	3	57
Iowa.....	1	1	0	2	1	0	0	1	50
Kansas.....									
Kentucky.....	13	0	0	13	5	0	0	8	38
Louisiana.....	12	14	11	37	1	0	0	36	3
Maine.....	15	0	0	15	0	0	0	15	0
Maryland.....	4	0	1	5	0	0	0	5	0
Massachusetts.....	12	0	0	12	12	0	0	0	100
Michigan.....	19	1	2	22	7	2	0	13	41
Minnesota.....	3	0	2	5	2	0	0	3	40
Mississippi.....	10	2	3	15	3	0	0	12	20
Missouri.....	3	0	0	3	0	0	0	3	0
Montana.....									
Nebraska.....									
Nevada.....									
New Hampshire.....	1	0	0	1	0	0	0	1	0
New Jersey.....	14	1	3	18	8	0	0	10	45
New Mexico.....									
New York.....	21	2	1	24	3	0	0	21	13
North Carolina.....									
North Dakota.....									
Ohio.....	14		1	15	14	1	0	0	100
Oklahoma.....									
Oregon.....	4	0	0	4	2	0	0	2	50
Pennsylvania.....	10	0	2	12	2	0	0	10	17
Rhode Island.....	3	0	0	3	3	0	0	0	100
South Carolina.....	2	0	1	3	0	0	0	3	0
South Dakota.....									
Tennessee.....	4	4	2	10	7	0	0	3	70
Texas.....	10	3	1	14	0	0	0	14	0
Utah.....									
Vermont.....	1	0	0	1	0	0	0	1	0
Virginia.....	11	3	2	16	6	0	0	10	38
Washington.....	17	1	0	18	0	0	0	18	0
West Virginia.....	6	0	1	7	0	0	0	7	0
Wisconsin.....	2	2	0	4	0	0	0	4	0
Wyoming.....									
Total.....	278	47	37	362	90	4	0	268	26

In this case also, the work is of such magnitude and importance that the small appropriation available has delayed the certification of a larger number of water supplies.

Arrangements are pending with the Canadian health authorities whereby a more effective supervision will be maintained over water supplies and water supply systems furnishing water for drinking, cooking, and washing purposes aboard Canadian and American vessels operating in interstate traffic on the Great Lakes and St. Lawrence River. In regard to vessels of Federal bureaus, arrangements have been made with the Corps of Engineers of the United States Army, the Bureau of Lighthouses, the Navy Department, the Housing Corporation, and the United States Shipping Board, so that safe

water supplies and sanitary water supply systems will be provided aboard their vessels for drinking, cooking, and washing purposes.

Through a cooperative arrangement instituted April 1, 1922, with the Steamboat Inspection Service, information concerning drinking, cooking, and washing water systems on vessels operating in interstate traffic is obtained by inspectors of the Steamboat Inspection Service at the time of their regular inspections and is forwarded directly to the district engineers of the domestic quarantine division. This arrangement has proved of great value to the United States Public Health Service already and has enabled the district engineers to extend the supervision of the bureau over many additional vessels with no increase in expenditures.

Through the distribution of a circular letter signed by the Secretary of the Treasury to all shipbuilding and repairing companies and naval architects and others concerned with information regarding drinking, cooking, and washing water systems on vessels, and follow-up conferences by district engineers, efforts are being made so that on new vessels, and on vessels being repaired, sanitary drinking, cooking, and washing water systems are installed in accordance with the requirements. Favorable results have already been obtained from this action.

INTERSTATE SANITARY DISTRICTS.

The following activities of district engineers of the domestic quarantine division were carried out during the past fiscal year: (1) Supervision over interstate carrier water supplies, including inspection of drinking, cooking, and washing water systems on vessels; (2) assistance to sanitary engineering divisions of State departments of health; and (3) other service policies.

DISTRICT 1.—MAINE, VERMONT, NEW HAMPSHIRE, RHODE ISLAND, MASSACHUSETTS, CONNECTICUT, NEW YORK, NEW JERSEY, PENNSYLVANIA.

Associate Sanitary Engineer Sol Pincus continued in charge of this district during the past fiscal year. After November 1, 1921, he was assisted by Junior Assistant Sanitary Engineer E. C. Sullivan.

The activities were the further development and carrying out of the work that was begun in the previous year with the establishment of this district, expanding in the field and perfecting the methods pursued. The chief activities were: (1) Supervision of vessel drinking water supplies, including the inspection of water supply systems on ships; (2) inspection of railroad coach yards and terminals as to water-handling facilities; (3) cooperation with State health departments in obtaining a more complete certification and improved local supervision of sources of water supply for common carriers, and in certain cases, general assistance and advice in the State sanitary engineering activities; (4) miscellaneous duties in connection with the practical operation of the interstate quarantine regulations; and (5) organization and cooperation in rodent surveys and in establishing other plague preventive measures at seaports. A report of this latter work is given in other sections.

VESSEL WATER SUPPLY SUPERVISION.

More systematic work has been carried on in the vessel water supply supervision during this year, although the routine work was considerably delayed by continued appearance of typhoid fever cases on river vessels at Pittsburgh early in the fiscal year. In all, 15 cases were reported from vessels in this district, each case being investigated upon receipt of the hospital reports. All were among the crews of vessels, no passengers being involved in any typhoid case. They were single sporadic cases, except for two cases from New York City tugboats and four cases occurring at about the same period on two river passenger vessels at Pittsburgh. As the cases at Pittsburgh were probably caused by the use of unpurified river water for drinking purposes, the vessel owners were given notices to discontinue at once the use of river water and to provide drinking water from safe shore supplies. These vessel owners had been previously notified to stop taking river water for drinking or culinary purposes and were forewarned of the dangers of this situation.

In the routine inspection of water-supply systems on vessels, 126 vessel inspections were made. On nearly all vessels visited improvements in the facilities for the storage and distribution of the drinking-water supply were necessary. These improvements were generally provided by the vessel companies in a short time following the sending of written recommendations, except in a few cases of owners of vessels engaged in river or principally local traffic. Almost all of the passenger vessels in coastwise and river traffic in this district are now complying with or making necessary changes to comply with the water-supply provisions of the regulations. The correction of objectionable features have been checked or reported by the vessel owners as being completed on 98 vessels during the fiscal year.

A special problem in this district has been the supervision of water-supply conditions on water boats which furnish water to larger coastwise and ocean-going vessels. A number of inspections have been made of these water boats, of which there are about 90 in this district. It was found to be a general practice to have their drinking-water delivery pumps connected to the seacock, and the same pumps used for flushing decks with harbor water or fighting fires were being used for pumping drinking water into other vessels. A standard set of sanitary requirements for water systems supplying drinking water was drawn up at conferences with owners of water boats at Philadelphia and New York and accepted by these owners. A number of water boats have already made installations of new pumps and water systems or changes and corrections in existing systems in compliance with the provisions of this standard set of requirements.

An investigation was made of water-supply conditions existing on vessels in the freight-towing traffic on the Hudson River and Erie Canal in New York State. A very insanitary situation was found in that the general practice prevailed of filling barrel containers for the drinking and culinary water supply from overboard, when in the less brackish or fresh water sections of the river and canal. A principal cause for this highly objectionable situation was found to be the complete lack of adequate facilities for obtaining

water for domestic purposes at the State-owned terminals and docks along the canal route. The question of providing additional water-supply facilities at the State-owned docks was taken up with two of the New York State departments concerned. It is felt that scarcely any progress can be made in improving this situation, which undoubtedly constitutes a serious health menace to the thousands of boatmen and their families who live on these vessels, until better water supply facilities have been provided at the more important State piers along the canal.

Arrangements have been made by which the local cooperation of health agencies is obtained in the routine supervision over vessel water supplies. Such joint supervision with local authorities is now in effect at Portland, Me.; Boston, Mass. (State health department); New York City; Philadelphia and Pittsburgh, Pa. In this manner local excursion vessels which carry large numbers of passengers, but which in some cases do not appear to come within the jurisdiction of the interstate quarantine regulations, have been required by the local authorities to meet regulations concerning water supplies similar to the service requirements. The New York City health department has enacted into the sanitary code new amendments and regulations governing water-supply conditions which were promulgated at the request of and in cooperation with the service engineer.

RAILROAD WATER SUPPLY SUPERVISION.

In the course of field trips, inspections were made of sources of water supplies used by railroad companies in order to check these with the lists reported by the companies. Inspections and studies were carried out of the methods of handling the water as it was placed in the train coolers and the methods of cleaning and steaming of containers. The matter of devising improvements in the protection of the hose used in filling the tanks on the coaches and in the more effective flushing and steaming of water containers was taken up by several of the carriers.

COOPERATION WITH STATE HEALTH DEPARTMENTS.

Personal conferences were had several times during the year with the health authorities in each of the States comprising the district. Explanations were made in connection with the use of the new water survey report form as well as various other points for facilitating the certification of water supplies for the common carriers.

Joint investigations were made of the public water supplies at Concord, Manchester, and Nashua, N. H., with the State sanitary engineer and details in the general principles involved in the State water-supply investigation and control were discussed. The provision for a State sanitary engineer in New Hampshire which had been achieved at the outset of this fiscal year has been declared by the State health officer to be a very valuable addition to the department's activities, and from every indication it will become a permanent, increasingly important factor for better sanitation.

In Vermont and Maine a number of water-supply and sewage problems were investigated and the important functions that could be carried out by a State sanitary engineer were demonstrated. A

detailed inspection was made of the Burlington, Vt., mechanical sand gravity filter and chlorination plant, recommendations for overhauling the filters and changing the hypochlorite methods to liquid chlorine after filtration were submitted. Several visits were made to the plant during the carrying out of these recommendations by city authorities. Inspection visits were made in Maine of public water supplies at Presque Isle, Caribou, Bangor, Old Town, Orono, and Portland and to a proposed source of water supply, for Winthrop, Me. Sewage disposal nuisances were inspected at Lake Maranacook and at York Beach, Me., at the request of the State authorities.

Investigations covering complete field surveys were made of the 21 public and railroad water supplies in the State of Connecticut. Detailed reports of these supplies were furnished the State health officer.

Jointly with the New York State Conservation Commission, supervision was given the oyster purification plant established at Inwood, Long Island. The successful operation on a commercial scale of an oyster purification plant was established. Further improvements in the mechanical equipment were recommended for installation previous to the second season of the plant.

An inspection was made of ozone machines for water purification at one of the larger factories where these machines are made. The detail designs and fabrication of the machines were studied as well as their operation. It is being planned to carry out tests on a full operating scale of this water purification process in the early part of the next fiscal year.

Lectures on public health subjects were given by the district engineer at the Convention of Railway Dining Car Superintendents, the New England Public Health Institute, Convention of Connecticut Water Works Officials, New England Committee on Plague Prevention and Rodent Control, Medical Officers' Class at Hygienic Laboratory, and at the Conference of the State and Territorial Health Officers.

The following tables give summarized information regarding vessel supervision, railroad water supply investigations, and special activities as carried out in the district during the past fiscal year:

TABLE 1.—*Summary of vessel water supply supervision.*

Number of vessels inspected.....	126
Number of vessels requiring improvements of water-supply facilities at time of inspection.....	112
Number of vessels upon which improvements of water-supply facilities were made.....	98
Number of vessels on which changes in the water-supply facilities are pending..	14
Number of vessels upon which improvements <i>only</i> in the operation and maintenance of the water supply facilities were necessary and were made.....	14
Number of certificates of inspection issued:	
Temporary.....	35
Regular (favorable).....	14
Regular (unfavorable).....	3
	52
Conferences with shipping officials.....	75

Number of cases of typhoid fever in connection with vessels of which reports were received and conditions investigated. (No cases of typhoid fever among passengers were reported).....	15
Number of local health departments cooperating in local supervision.....	5
Number of local health departments adopting special regulations for vessel water supply supervision.....	3 1

TABLE II.—*Summary of railroad water supply supervision.*

Investigation of sources of water supply of common carriers:	
Public water supplies.....	30
Private water supplies.....	5
Inspections of terminals and coach-yards.....	16
Conferences with railroad officials.....	12

TABLE III.—*Summary of special activities.*

Conferences with State health authorities.....	42
Conferences with local health authorities.....	28
Special investigations:	
Anthrax, oyster purification, milk supervision, ozone, filter plants, etc.....	9
Addresses given on public health subjects.....	11

DISTRICT 2.—DELAWARE, MARYLAND, VIRGINIA, WEST VIRGINIA,
NORTH CAROLINA, SOUTH CAROLINA, DISTRICT OF COLUMBIA.

Assistant Sanitary Engineer I. W. Mendelsohn continued in charge of this district during the past fiscal year. During part of October and November, 1921, Junior Assistant Sanitary Engineer H. J. Green was detailed to the district for special work. The activities of the district included (1) administrative work at the bureau; (2) special technical assistance to the sanitary engineering divisions of State departments of health; (3) supervision over vessel water supply system; (4) special investigations. The administrative work at the bureau was in connection with the policies of the Public Health Service concerning prevention of spread of communicable diseases among the States and the District of Columbia, and the carrying out of the interstate quarantine regulations of the United States.

During the past fiscal year special service has been rendered the sanitary engineering divisions of State departments of health in furnishing technical information upon request, all with the object of assisting in their development and thereby improving the defenses against interstate spread of communicable diseases. Of chief importance in this service was the publication of the weekly Public Health Engineering Abstracts containing abstracts of technical articles of current literature of value to the sanitary engineers. From December, 1921, the number of regular abstractors was increased to include all the district engineers of the domestic quarantine division. During the period January 1, 1921, to June 30, 1921, 2,505 copies of 27 issues were mailed, while in the period July 1, 1921, to June 30, 1922, 12,142 copies of 52 issues were sent. The number of magazines available for abstracting has increased from 69 on July 1, 1921, to 243, June 30, 1922. The number of abstracts published during the periods January 1, 1921, to June 30, 1921, and July 1, 1921, to June 30, 1922, were 237 and 611, respectively. Through these Public Health Engineering Abstracts information is brought to the attention of State sanitary engineers in a short time in condensed form, such information frequently not being otherwise readily available to the

³ New York City.

State sanitary engineers. Special inquiries concerning sanitary engineering matters have been investigated and the information furnished promptly.

In regard to the supervision over drinking, cooking, and washing water systems on vessels operating in interstate traffic in this district and the water supplies used on board, the activities of this office during the past fiscal year were as follows:

Number of vessels inspected.....	116
Number of vessels reinspected.....	35
Number of vessels to be improved.....	114
Number of vessels partially improved.....	45
Number regular certificates issued.....	2
Number temporary certificates issued.....	25

The chief ports in this district are Baltimore, Washington, and Norfolk, and efforts have been concentrated on the vessels operating out of these ports to improve the drinking, cooking, and washing water supplies and systems on board. Cooperative arrangements have been made with the city health departments to have their inspectors collect samples of drinking, cooking, and washing water from various taps aboard the vessels at regular intervals and make bacteriological analyses. Through these arrangements instituted in June, 1922, it is expected to increase the effectiveness of the supervision over the drinking, cooking, and washing water systems on the vessels in this district.

The principal improvements found necessary in the drinking, cooking, and washing water systems on vessels in this district include (1) replacement of contact ice and water coolers by separate compartment coolers; (2) physical separation of drinking, cooking, and washing water systems from any other water systems on board; (3) replacement of common drinking cups and towels by individual drinking cups and towels; and (4) use of one hose for filling the drinking, cooking, and washing water storage tanks and storage of same in a sanitary locker. When the matters have been taken up with the vessel companies, their cooperation has been readily obtained in the majority of cases, and the improvements have been provided promptly. Conferences were held with the vessel company officials and vessel officers at the time of inspection, and the necessity for and the kind of improvements were considered in detail. These vessel officers were informed as to the proper sanitary methods to be used in providing a safe water aboard for drinking, cooking, and washing purposes from approved shore supplies. About all the coast vessels in this district obtain their water for such purposes from satisfactory supplies ashore.

Special investigations were made (1) of the Curtis Bay quarantine station water supply in August, 1921; and (2) of the public water supply at Asheville, N. C., in September, 1921, at the request of the State health officer. Junior Assistant Sanitary Engineer H. J. Green investigated the methods of filling water coolers in cars in the railroad yards at Wilmington, Del., in the fall, 1921.

DISTRICT 3.—OHIO, INDIANA, ILLINOIS, MICHIGAN, WISCONSIN.

Assistant Sanitary Engineer A. E. Gorman remained in charge of the district during the past fiscal year. The activities were confined largely to exercising supervision and control over water provided

for drinking and culinary purposes on vessels and trains operating in interstate traffic. During the navigation season active field work was confined to Great Lakes, St. Lawrence River, and Ohio River vessels. In the winter and spring months attention was devoted to railroad water supplies, especially in connection with the handling of drinking water, ice for chilling same, and water coolers and containers in coach yards and terminals.

WATER SUPPLIES ON GREAT LAKES AND ST. LAWRENCE RIVER VESSELS.

The navigation season of 1921 was the first full season during which an active and uniform policy for exercising supervision and control over drinking and culinary water on the Great Lakes and St. Lawrence River vessels was carried out. This policy was a cooperative one between the Federal, State, and local health authorities. All matters concerning administration and enforcement of the United States interstate quarantine regulations relating to drinking water were handled through the district engineers, and service engineers made inspections of drinking-water systems on vessels, including methods of delivery of water to storage tanks, treatment apparatus, and distributing systems aboard. The State departments of health cooperated by certifying as to the sanitary quality of water obtained from sources of supply ashore, as is done with railroad water supplies; while the city health departments of Buffalo, Chicago, Cleveland, Detroit, Toledo, and Milwaukee gave valuable assistance by collecting weekly or semiweekly samples from the drinking-water system on passenger vessels calling at their respective ports and making bacterial analyses of same. The results of these analyses were mailed to the district engineer's office weekly. Here they were tabulated and reported to the respective shipping companies on whose vessels these samples were collected. In case analyses showed serious contamination of the samples collected, telegraphic reports were made to the district engineer and immediate corrective measures were arranged for. During the navigation season of 1921, 1,802 samples were collected and analyzed through this cooperative arrangement, and during the 1922 season to July 1, 695 have been analyzed.

During the season of 1921 there were 55 American passenger vessels in operation on the Great Lakes and St. Lawrence River on which drinking or culinary water was provided and over which supervision was exercised. To date, there are 58 reported in commission for 1922. These figures do not include car ferries, on which there is a considerable passenger traffic during the summer months. They also do not include ferries which run on such short routes that drinking water is not provided and on which upward of 11,000,000 passages are taken annually. Besides these vessels there were 9 Canadian passenger vessels in operation on these waters, which called regularly at American ports. It is reported that there are 10 such vessels in commission in 1922.

It is estimated that between 4,500,000 and 5,000,000 people travel annually on Great Lakes and St. Lawrence River passenger vessels calling at American ports. The crews employed on these vessels in the aggregate average about 5,000 men. There are about 450 American freight vessels, 65 barges, and 20 car ferries in the Great Lakes fleet. Besides this, there are about 100 freighters, 50 barges, and 10 car ferries of Canadian registry. Including passenger vessels

it is estimated that about 20,000 seamen are employed on the Great Lakes and St. Lawrence River fleet, not considering the turnover in labor which varies according to economic conditions. From the above figures concerning the number of persons employed and taking passage on vessels navigated in these waters during relatively short seasons, the public health importance of a strict supervision of the drinking water provided is self-evident.

On most of the large passenger vessels operating on the Great Lakes and calling at American ports, treatment apparatus for disinfecting water taken from "overboard" enroute have been installed. On smaller vessels of this class water for drinking and culinary purposes is usually obtained from sources ashore. Upward of 80 per cent of the American interlake fleet is equipped with distillers for supplying drinking and culinary water. Others depend on sources of supply ashore. The methods by which water was obtained on American passenger vessels during the 1921 and 1922 seasons are given in the following table:

Sources ashore or treatment aboard.	1921	1922 (to July 1).
Filtration and ultra-violet ray disinfection	27	28
Filtration and ozone disinfection	2	2
Disinfection by heat treatment with steam	5	0
Distillation	4	4
Water from certified sources ashore	17	24
	55	58

In general, the attitude of shipping officials and their employees toward the new regulations concerning drinking water on vessels was good. They seemed especially desirous to provide a safe drinking water and cooperated with the district engineer willingly. In several instances a considerable outlay of money was necessary to correct insanitary or potentially dangerous conditions found to exist in connection with the drinking-water systems on their vessels, and the promptness and willingness which operating companies displayed in making the necessary changes recommended was commendable. In all changes of major character involving considerable expense and work, the district engineer made a special report with recommendations to the operating company and cooperated with the proper officials concerning this work. By-passes around treatment apparatus, cross connections between the drinking-water system and any other water system aboard, dual sources for drinking, cooking, and washing purposes, and storage of water in tanks formed in part by the hull of the vessel, were some of the more important undesirable and unsafe conditions found on inspection of drinking-water systems on vessels, recommendations for correction of which were made. Some of the major changes made on vessels during the last year as a result of recommendations to and conferences with shipping officials are:

Abandonment of tanks formed in part by the hull of the vessel and the installation of independent storage tanks for drinking water	5
Installation of storage tanks for water treated aboard the vessels	4
Abandonment of inefficient water-treatment apparatus and changing of piping system on vessels to provide for obtaining drinking water from sources ashore:	
Permanent	6
Temporary	2

Purchase of new water-treatment apparatus.....	3
Removal of sewer lines from raw-water tanks and provisions for water-tight manhole covers.....	2
Major changes in piping system on vessels to eliminate conditions potentially dangerous to drinking water (not included above).....	11
Total.....	35

A sanitary inspector was detailed to Cleveland, Ohio, and Sault Ste. Marie, Mich., from June 15 to September 1, 1921, to inspect vessels. An inspector has also been on duty at the latter port since June 15, 1922. Inspections are made while the vessels are "locking through" the Government canal in the St. Marys River. A qualitative test is made of the water in the drinking-water tanks on vessels equipped with distillers to find out if the distiller was used; and if so, whether it was working properly. Many of the distillers on freighters, which were purchased several years ago, were found to be in poor condition and replacements were necessary. On account of economic conditions less than one-half of the American interlake freight fleet was reported in commission in 1921. The following table summarizes the inspection work on vessels accomplished during the period of July 1, 1921, to June 30, 1922:

Type of vessel.	1921		Navigation season, 1922.		Total.	
	Inspection.	Reinspection.	Inspection.	Reinspection.	Inspection.	Reinspection.
Passenger.....	31	34	34	8	65	42
Freight.....	168	47	47	2	215	49
Car ferry.....	6	0	9	1	15	1
	205	81	90	11	295	92

On account of the practical impossibility of making sufficient reinspections of all vessels, and the many changes in the water systems which had to be made, a policy of issuing no regular certificates of inspection was adopted for the 1921 navigation season. Unfavorable certificates were issued in 1921 for the drinking-water systems on five passenger vessels on which the water-treatment apparatus were not giving efficient results. On four of these vessels the treatment apparatus were re-equipped, while on the fifth arrangements were made for obtaining water from sources ashore. The following table summarizes the temporary certificates issued during the period July 1, 1921, to June 30, 1922:

Type vessel.	Navigation season.		Total.
	1921	1922	
Passenger.....	31	22	53
Freight.....	97	184	281
Car ferry.....	7	2	9
	135	208	343

Thirteen cases of typhoid fever among Great Lakes seamen, with two deaths, were reported as hospitalized at United States marine

hospitals during the 1921 navigation season. To July 1, three cases were reported in the 1922 season. In the following table these cases are tabulated by classes of vessels:

Type vessel.	Navigation season.	
	1921	1922
Passenger.....	2	0
Freight.....	15	2
Tug.....	2	0
Barge.....	0	1
United States Government vessels.....	4	0
	13	3

¹ Two deaths.

For the number of men employed, the typhoid index among Government-owned vessels was exceedingly high in comparison to merchant vessels. A special report with recommendations concerning the supplying of drinking water on Government-owned vessels was made to the bureau for cooperation with the Federal departments concerned.

WATER SUPPLY ON OHIO RIVER VESSELS.

During the summer of 1921 Assistant Sanitary Engineer A. E. Gorman and Junior Assistant Sanitary Engineer E. C. Sullivan made inspections of the methods under which drinking and culinary water was being provided on Ohio River passenger and packet freight vessels between Cincinnati, Ohio, and Cairo, Ill. It was found that this water was being obtained from public supplies ashore and from the river, either direct or from the ship's boilers. Water obtained from public supplies ashore was usually drawn from a hydrant at the head of the steamboat landing and delivered to the boat in pails, buckets, barrels, and miscellaneous containers used on steamboats. This practice, together with its storage aboard in wooden barrels, exposed the water to many potential sources of pollution. Through the cooperation of the Cincinnati department of health, 263 samples of water were collected from the drinking-water tanks and coolers on Ohio River passenger vessels from July to the end of the calendar year 1921. Bacteriological analyses of these samples showed the water to be frequently seriously contaminated. Temporary measures were recommended to protect the drinking and culinary water from contamination due to excessive handling; and subsequent analyses showed a marked improvement in the sanitary quality of this water.

Clearly, the problem of supplying a safe drinking water to river vessels was one of the sanitary handling in delivery to and storage aboard of water obtained from certified sources ashore. A general plan worked out as a satisfactory solution for this problem was recommended to the shipping companies for adoption. The salient features of this plan were:

1. The establishment of stations at the steamboat landings at large terminal ports of call, where a safe drinking water from the city supply could be conveniently obtained for vessels.

2. The extension of a pipe line at these ports from the city main to the steamboat landing, with various hydrant connections in the line to provide for varying stages of the river.

3. The installation of a permanent pipe line over the wharf boats from the landing side to the river side, connected to one of the hydrants on the landing by a hose.

4. The installation on all vessels of metallic storage tanks of adequate capacity to supply drinking and culinary water between ports of call, with a filling line to these tanks extending to the port side of the vessels.

5. The installation of distillers on vessels operating on routes when the obtaining of drinking water from regular stations was impossible or impractical.

By this system water from sources ashore could be delivered directly into the storage tanks on the vessel by the pressure in the city mains. A short section of hose would, of course, have to be used to connect the filling line on the port side of the vessel and the hydrant on the river side of the wharf boat, thus eliminating excessive handling of the water. A special filling hose with adequate storage space for same was recommended for each vessel. The locking and identifying of storage tanks was also urged.

Junior Assistant Sanitary Engineer A. L. Dopmeyer was assigned to the Ohio River vessel work early in February with field headquarters at Cincinnati, Ohio. He cooperated with shipping officials in connection with the pipe-line extensions to wharf boats and changes in drinking-water systems on their vessels. To July 1, 1922, pipe lines to wharf boats had been installed at the following Ohio River cities:

Pittsburgh, Pa.
Gallipolis, Ohio.

Cincinnati, Ohio (2).
Louisville, Ky.

Evansville, Ind.
Paducah, Ky.

Cooperative arrangements similar to those described under Great Lakes work have been made with State and local health departments for the collection and bacteriological analyses of samples of water from the drinking-water system on passenger vessels calling at the following cities on the Ohio River and its tributaries:

Pittsburgh, Pa.
Wheeling, W. Va.
Charleston, W. Va.

Cincinnati, Ohio.
Louisville, Ky.

Evansville, Ind.
Paducah, Ky.

A total of 1,166 samples were collected and analyzed during the period July 1, 1921, to June 30, 1922.

There are about 80 ferryboats crossing the Ohio River between various cities and towns, but the run is so short that drinking water is rarely provided. On account of the new policy being put into effect for the first time during the 1922 navigation season, certification of drinking-water systems on vessels was delayed in order to give the shipping companies an opportunity to make the installations recommended. But six certificates of inspection, all temporary, were issued during the year. The following table summarizes the work done during the period July 1, 1921, to June 30, 1922, in connection with the supplying of drinking water on Ohio River vessels:

Inspection of vessels.	Navigation season.		Total.
	1921	1922	
First inspections.....	30	105	135
Reinspections.....	24	98	122
Corrections made.....	9	58	67
<i>Wharf-boat and landing surveys.</i>			
First inspections.....	5	7	12
Reinspections.....	4	19	23
Corrections made.....	0	13	13
<i>Conferences.</i>			
Shipping officials.....	21	134	155
Health officials.....	9	27	36
Other officials.....	4	11	15

RAILROAD WATER SUPPLIES.

Attention has been given to the handling of drinking water provided for trains operating in interstate traffic, especially in coach yards and terminals. Where water is obtained from certified sources it is often contaminated before being served to the public, because of insanitary handling in filling coolers and icing. Six reinspections were made of the 13 coach yards in Chicago inspected last year. First inspections of coach yards were made in the following terminal cities in this district:

Cincinnati, Ohio.....	3	Indianapolis, Ind.....	3
Cleveland, Ohio.....	2	Milwaukee, Wis.....	1
Columbus, Ohio.....	4		

Three hundred and sixty-three samples of water from coolers on outgoing and incoming trains at Chicago terminals were collected during the winter and spring months and analyzed at the laboratory at United States Marine Hospital No. 5.

Repeated reports of contaminated water from trains was made the subject of a special investigation. It was found that in general the sanitary quality of the drinking water on trains of any one company was a fair index to the sanitary conditions under which this water was being handled in the coach yard or terminals. Corrections in several coach yards in this district were made as a result of the recommendations to railway officials. The American Railway Association has appointed a special joint committee to investigate and report on the subject of railroad terminal and coach yard sanitation.

MISCELLANEOUS INVESTIGATIONS.

In September Assistant Sanitary Engineer A. E. Gorman was detailed to investigate a reported serious condition in the Fox River near Appleton, Wis., due to the sudden death of a large number of fish, jeopardizing the safety of the public water supply at that city. It was found that the filtration plant at that city was handling the situation satisfactorily.

DISTRICT 4.—KENTUCKY, TENNESSEE, FLORIDA, MISSISSIPPI, ALABAMA, GEORGIA.

Associate Sanitary Engineer C. N. Harrub was in charge of this district during July, 1921. He was assisted by Junior Assistant Sanitary Engineer H. J. Green, who was on duty in the district till November, 1921. Associate Sanitary Engineer H. H. Wagenhals was in charge after March 1, 1922, there being no service officer in the district from November to March. In March the headquarters were moved from Nashville, Tenn., to Atlanta, Ga.

RAILROAD WATER SUPPLIES.

Seventy, or over 90 per cent, of the interstate railroad water supplies in Georgia were inspected and reported on by Junior Assistant Sanitary Engineer H. J. Green; 107 favorable and 15 unfavorable certificates were issued to railroads, and 12 supplies were condemned. In addition some supplies in Florida were inspected.

Investigation was made by Associate Sanitary Engineer H. H. Wagenhals of coach yards in Atlanta, Ga., with special reference to the methods used in cleaning coolers.

Conferences were held with all State boards of health in this district relative to this work.

VESSEL WATER SUPPLIES AND WATER SUPPLY SYSTEM.

This work was materially handicapped by its discontinuance from August, 1921, to March, 1922. It was necessary to practically begin the work all over again in March, 1922, as contact with vessel companies had been lost, and all follow-up work abandoned.

Letters have been sent to 211 vessel companies, and follow up letters to 94 who failed to answer the first letter. Masters' statements of drinking-water system have been received from 13 vessel companies covering 31 vessels. Twenty-seven vessels were inspected, 9 favorable and 10 unfavorable certificates of inspection issued, and 8 held pending necessary improvements.

Arrangements were made with the city board of health of Savannah, Ga., for the making of analyses of water taken from excursion vessels operating in that harbor.

Four cases of typhoid fever occurring on vessels were reported to the district office during the year.

MISCELLANEOUS.

Junior Assistant Sanitary Engineer H. J. Green assisted the Georgia State Board of Health in the study of wells supplying the city of Savannah and adjacent territory in Chatham County. The reason for the investigation was the occurrence of a high saline content in some wells supplying Savannah. The trouble was found to be due to leaking casings.

Conferences have been held with all State departments of health in this district, several city departments of health, the Steamboat Inspection Service, engineers, and others.

Associate Sanitary Engineer H. H. Wagenhals attended a school for municipal officials held by the Kansas State Board of Health, presenting a paper on the "Disposal of creamery wastes."

An investigation of the alleged contamination of a lake on the property of the Capitol City Club of Atlanta, Ga., by the sewage from the United States Veterans Hospital No. 48 was made by Associate Sanitary Engineer H. H. Wagenhals. Improvements recommended are being carried out.

At the request of the State Board of Health of Georgia, the district engineer cooperated with the State sanitary engineer in the study of the causes of tastes in the water supply of Greensboro, Ga. The trouble was found to be due to iron taken up by the water after entering the mains. It was corrected by the use of soda ash in the treatment process.

At the suggestion of the district engineer, the bureau detailed Assistant Sanitary Chemist E. J. Theriault to Atlanta, Ga., to give a short course on hydrogen-ion determination, with special reference to its application to water treatment to the State sanitary engineers in interstate sanitary district No. 4, and adjacent States. Representatives from four States and a number of cities were present. There was an average attendance of 19.

DISTRICT NO. 5.—TEXAS, LOUISIANA, OKLAHOMA, ARKANSAS.

Associate Sanitary Engineer A. F. Allen remained in charge during the entire year. Junior Assistant Sanitary Engineer A. L. Dopmeyer was also attached to this district for the period July 1, 1921, to February 3, 1922.

PLAGUE CONTROL.

Frequent inspections were made of the major rat-proofing work in New Orleans and Galveston. Tables and charts showing summaries of the operations of New Orleans and Galveston plague eradication stations were prepared.

RAILROAD WATER SUPPLIES.

For the purpose of complying with the provisions of the United States interstate quarantine regulations in regard to the certification of water supplies for use by common carriers in interstate traffic, this office inspected 116 water supplies in this district during the year and prepared reports which were submitted to the State health departments having supervision of these supplies. Six special conferences were held with municipal authorities at the request of the State health departments in order to urge upon the local authorities the need of correcting conditions in water supplies. A special 10 days' test of the efficiency of the Muskogee, Okla., water purification plant was made, and a report prepared for presentation to the Oklahoma State Department of Health.

VESSEL WATER SUPPLIES.

At the end of the year there were known to be 119 vessel-operating companies having home offices within this district and having vessels coming within the provisions of the United States interstate quarantine regulations, so far as they apply to the certification of vessel water-supply systems. At the end of the year there were 394 vessels operating in this district regarding which information has been received from the owning or operating companies. No permanent

certificates for vessel water-supply systems were issued but 88 temporary certificates which were issued during the year for boats within the jurisdiction of this district remained effective until June 30, 1922. Fifteen vessel water-supply systems were inspected.

MISCELLANEOUS.

The Texas State Board of Health was assisted in preparing data for presentation to the State legislature showing need of engineering activities in the State health department. Four addresses were delivered, and the annual meetings of the State medical associations of Texas and Oklahoma were attended. The engineer in charge devoted five weeks to assisting the district engineer of the United States War Department, Mississippi River Commission, fourth district, in flood control and refugee relief work during the period of unusually high water in the Mississippi River.

DISTRICT NO. 6.—MISSOURI, IOWA, NEBRASKA, MINNESOTA, NORTH DAKOTA, AND SOUTH DAKOTA.

Assistant Sanitary Engineer Joel I. Connolly continued in charge of this district during the past fiscal year. The activities were principally concerned with the certification of water supplies used for drinking and culinary purposes on common carriers, both railroads and vessels, engaged in interstate traffic, and in assisting the State boards of health in this district, particularly in connection with the cooperative procedure for this certification.

VESSEL WATER SUPPLIES.

The work among vessels in this district started practically with the beginning of the past fiscal year. Many serious problems have been encountered, due to the peculiar conditions under which river vessels must operate. These conditions included floods and extreme low water, lack of city water mains to the river edge at most towns, and the highly polluted character of many of the streams.

An effort has been made to provide water from approved sources ashore, and to establish satisfactory methods of getting it aboard the vessel and storing it there. In all cases where this was impossible it has been the policy to require adequate purification of the water aboard the vessel.

During the first half of the fiscal year 7 vessels which had been inspected during the previous year were reinspected, and 73 additional vessels were inspected for the first time. Reinspections were later made of 6 of these vessels. During the second half of the fiscal year 12 vessels were inspected for the first time, and 14 vessels (which had been inspected before) were reinspected. A total of 40 inspections were made.

Conferences of major importance in regard to vessel water numbered about 50, in addition to approximately 140 conferences with the officers of the vessels held at the time of inspection. A large number of vessels were engaged as ferries or in other classes of work having short runs. In these cases an effort was made in conferring with the owners to have the carrying of water for drinking and culinary purposes on these runs discontinued, in order that the public might be protected, and at the same time the work of supervision

might be materially reduced. Attention has been largely concentrated during the latter part of the fiscal year on large vessels carrying large numbers of people, since it is felt that in this direction lies the greatest effectiveness of the work.

Number of vessels inspected for the first time.....	85
Reinspections.....	67
Conferences with vessel officials in regard to improvements of major importance.....	40
Conferences with others, of major importance.....	11
Conferences with vessel officials, minor importance.....	140

Routine examinations of water supplies aboard vessels, both by qualitative chemical tests and by bacteriological tests, were instituted in the spring of 1922, with a view to gauging the improvement of water supplies effected by the changes made in the equipment of the vessel for purifying, handling, and storing water. The cooperation of the city of St. Louis was secured for examining the samples collected, and during the last two months 112 samples of water have been collected and examined by the city laboratory. The results of these examinations were reported to the respective vessel owners.

RAILROAD WATER SUPPLIES.

With the States of this district becoming better able to cooperate in the certification of railroad water supplies, it has been found desirable to direct attention to some other phases of the problem. One which has received considerable attention in this district during the past year has been the handling of water, when filling water coolers on trains, in such a manner as not to impair its sanitary quality and safety. A few water supplies used by railroads engaged in interstate traffic have been inspected, but in such cases the information obtained has been turned over to the State board of health, so that certification may originate with them. The facilities for supplying water to trains at coach yards and terminals have been inspected in St. Louis, Kansas City, Jefferson City, Mo., and Lincoln, Nebr. The five yards in St. Louis have been inspected three times, some of these inspections being made in company with officials of the railroad in order that they might be informed as to existing conditions and necessary improvements. Fourteen conferences have been held with railroad officials in St. Louis in regard to coach-yard sanitation. Three of the Kansas City coach yards have been inspected and three conferences held.

Some very insanitary conditions have been found, due both to poor equipment and to ignorance of sanitary requirements by employees. Considerable attention has been devoted to educating the coach-yard foremen and the employees charged with the important duty of watering the trains, for the purpose of improving the practices employed in the yards. Until the time of the present strike the improvement was very noticeable. The employment of new men for this work since the strike will necessitate a part of this educational work being repeated, but the coach-yard foremen are relatively permanent, and efforts in this direction are undoubtedly proving of great value.

Railroad water supplies inspected.....	9
Coach yards inspected.....	10
Reinspections.....	10
Conferences.....	19

COOPERATION WITH STATE BOARDS OF HEALTH.

Cooperation with State boards of health has been an important part of the work of this district during the past year. Two of these States, namely, Nebraska and Iowa, employed new State sanitary engineers about the beginning of this year. These men were unfamiliar with the procedure for the cooperative certification of water supplies, and it was, therefore, necessary to arrange conferences with them early in the year. Two other States, namely, South Dakota and Missouri, organized engineering divisions, and appointed State sanitary engineers during the past year. One of these has since been appointed a collaborating sanitary engineer of the Public Health Service to facilitate the cooperative certification of water supplies.

Assistance was rendered the State sanitary engineer of South Dakota during part of December, 1921, in regard to policies, rules, and regulations, minimum requirements for sanitary works, plans of campaign, cooperative certification of water supplies used for drinking and culinary purposes in interstate traffic, and similar matters. The State Board of Health of Missouri has been assisted at various times during the year, especially before the appointment of the State sanitary engineer. A number of sewage nuisances were investigated at the request of the State board of health. Thirteen conferences were held during the year with the representatives of the State Board of Health of Missouri, three conferences with the Minnesota State Board of Health, one with the North Dakota State Board of Health, two with the South Dakota State Board of Health, two with the Nebraska State Board of Health, and three with the Iowa State Board of Health. As a result of these activities, the engineering divisions of the State boards of health in the States in this district have been strengthened, and in two cases newly created and established upon a firm and progressive footing.

DISTRICT NO. 7.—MONTANA, IDAHO, WASHINGTON, AND OREGON.

DISTRICT NO. 8.—CALIFORNIA, ARIZONA, AND NEVADA.

DISTRICT NO. 9.—WYOMING, COLORADO, UTAH, NEW MEXICO, KANSAS.

Sanitary Engineer H. B. Hommon was in charge of the three districts, assisted by Junior Assistant Sanitary Engineers L. D. Mars and A. P. Miller. These engineers were also in charge of sanitation in national parks, and the time devoted to certification of water used by common carriers was between October 1, 1921, and June 10, 1922.

In district No. 7 conferences were held with the State health officers of each State in the district, and sanitary surveys of 23 sources of supplies were made. In addition to this work, examinations of water-supply systems on vessels of the Pacific coast that come under the provisions of the interstate quarantine regulations were made. There are more than 300 of these vessels.

The following table gives a summary of the data collected in relation to vessel water-supply systems:

	Seattle.	Portland.	San Francisco.	Los Angeles.	Total.
Vessels inspected.....	52	15	51	0	118
Certificates issued.....	34	0	29	0	63
Changes recommended and carried out.....	2	0	7	0	9
Changes recommended and certificates pending.....	16	15	15	0	46
Inspections reported by Steamboat Inspection Service ¹ .	39	28	57	6	130

¹ Of the 130 vessels inspected, 59 were towboats and pleasure craft that do not come under the interstate quarantine regulations.

Visits were made to the respective States in the district but inspections of sources of water supplies were made only where advice and assistance by the Government was necessary to secure improvement.

In district No. 9 the sanitary engineer cooperated with the State health officers from October 24 to December, 1921, and from March 23 to April 20, 1922. During this time all the five States in this district were visited and especial attention given to the three that do not have State sanitary engineers. Standard procedures were outlined for bacteriological work, sanitary surveys of sources of water supplies and handling of water, and practical systems recommended for keeping office records. Eighteen sources of supplies were examined in the three States. A comprehensive survey of the different sources of water supplies used by the city of Los Angeles, Calif., was made, this work being carried out in cooperation with the State board of health.

A series of lectures were delivered by Sanitary Engineer H. B. Hommon before the Public Health Institute at Portland, Oreg., and Spokane, Wash., on the subject of water purification and sewage and garbage disposal.

SUPPRESSION OF TYPHUS FEVER IN NEW MEXICO.

The typhus-control measures instituted in May and June, 1921, among the Navajo Indians near Shiprock, N. Mex., were continued during the past fiscal year until September 4, 1921. The service, upon the request of the Interior Department in May, 1921, detailed Passed Asst. Surg. C. E. Waller, acting as State health officer of New Mexico, Passed Asst. Surg. J. W. Tappan, and Passed Asst. Surg. Charles Armstrong to assist in controlling this epidemic.

Delousing stations were established in five districts. A portable delouser weighing about a ton was manufactured, the essential parts consisting of a 3-horsepower boiler, motor truck, 400-gallon hot-water tank and bathing sprays, and two steam tanks for sterilizing the clothing. In view of local conditions it was necessary to operate the delouser in one district at a time, the infected districts being visited at intervals of about 20 days.

The procedure of operation was as follows:

Prior to, or upon, going into a district for the purpose of delousing, mounted guards were sent out to notify the Indians that delousing would begin on a certain day and that they should come and bring their bedding (pelts), blankets, and quilts as early as convenient. This notice was usually sufficient, but in case any failed to appear a

second summons was sent out. When the Indians arrived at the delousing station, they were instructed by an assistant to deliver their blankets, quilts, and other articles that would not be injured by heat to the steam sterilizers for treatment. This treatment consisted of subjecting the articles to live, confined steam for 20 or 30 minutes. While this was going on, the women took the sheep pelts to the tubs where they washed them in a solution of nicotine sulphate (40 per cent) 1 to 1,000 in alkaline water at a temperature of from 100° to 110° F., using soap in the process and thoroughly rinsing the articles, after which they were spread on the ground or hung on a fence to dry. When ready for the actual delousing process, the applicants' heads were thoroughly washed with a mixture of kerosene and dilute acetic acid, equal parts, and usually they were given a head spray with the same solution. For males, the next step was to cut the hair of those who were willing to have it done. About 15 per cent accepted this service.

There were two bathing tents, one for men and one for women. After the head treatment, the Indians were directed to their respective tents. In the tents their clothing was removed, placed in sacks, thrown out, and by an attendant delivered to the steam sterilizers for from 20 to 30 minutes' treatment. Shoes, belts, hats, and other articles damagable by steam were sprayed with a 1 to 500 nicotine sulphate solution, 40 per cent (Blackleaf 40, used in sheep dipping). The applicants next proceeded to the shower bath where, under the supervision of the attendant, their heads and bodies were thoroughly washed in soap and water, the soap being prepared by boiling one part of soap chips in four parts of water, and adding two parts of kerosene. The solution used for the preliminary bath consisted of one part of this mixture to four parts of warm water. Following this preliminary bath the applicants were given an ordinary bath with soap and warm water. Rough towels were used for drying. After the completion of the bathing process, the bathers were given a sheet to use as a cloak in which they passed from the bathing tent to the dressing tent where their sterilized clothes awaited them or were delivered as soon as ready.

Delousing record.

District.	Males.		Females.		Total.
	Adults.	Children.	Adults.	Children.	
River (agency).....	261	223	338	299	1,121
Red Rock.....	298	303	463	482	1,546
Tosito-Walker store.....	626	499	412	362	1,899
Toadlena.....	191	150	235	225	801
Teece Nos Pos.....	169	169	254	246	838
	1,545	1,344	1,702	1,614	6,205

One of the results of the delousing operations was the spread of cleanly habits among these Indians—soap, kerosene, and washboards being purchased.

The first case of typhus in this epidemic occurred about November 10, 1920, and the last on June 13, 1921. The first death occurred about December 20, 1920, and the last June 27, 1921.

Numerical summary of typhus cases.

INDIANS.

District.	Recoveries.			Deaths.			Grand total.
	Male.	Female.	Total.	Male.	Female.	Total.	
River (agency).....	1	3	4	4	0	4	8
Red Rock.....	10	12	22	7	2	9	31
Tosito-Walker store.....	6	3	9	6	6	12	21
Chaco.....	1	0	1	0	0	0	1
Total.....	18	18	36	17	8	25	61

WHITES.

River (agency).....	0	0	0	1	0	1	1
Red Rock.....	0	0	0	1	0	1	1
Total.....	0	0	0	2	0	2	2

Mounted police were employed to travel from hogan to hogan (Indian dwelling) in the various districts and to locate and report every case of illness found of whatever nature. All cases reported were visited.

In the districts where typhus had been found the natives were called together and, through an interpreter, the nature, means of spread and prevention were explained in a simple manner. They were told how to combat lice and asked to do all they could in this direction. Certain concessions were made in regard to the medicine men, who were permitted to hold their "sings" provided the patient and "hogan" be first deloused and himself deloused before leaving the camp, and that he carry out the rites without the aid of the usual crowd of friends and clan folk.

"Louse proof" uniforms were provided for the personnel engaged in typhus work.

General plans for handling the campaign were formulated and copies placed in the dispensary, office, and other places available to public.

Through the institution of prompt and thorough measures, this epidemic was checked in a short time, with practically no hardship or inconvenience to the Indians, and at small expense considering the magnitude of the situation.

Since the close of this campaign on September 4, 1921, one case of typhus was found on December 16, 1921, at Mescalero, N. Mex. De-lousing operations were immediately carried out. The infection is believed to be due to intercommunication between the Mescalero Reservation and the typhus infected towns across the Rio Grande.

SMALLPOX CONTROL MEASURES.

During the past fiscal year three smallpox outbreaks occurred, in controlling which the service participated at the request of the State health officers. In all three the most noticeable feature was the fact that the spread of the disease was largely possible because of the opposition or apathy of the people to smallpox vaccination. During and after these outbreaks the people in these cities in their immediate

vicinity were vaccinated in large numbers and the disease was checked in a short time after such measures were instituted.

The first and largest outbreak was at Kansas City, Mo., in November and December, 1921. Surg. J. P. Leake was detailed to make a study of the situation, cooperating with the State Department of Health of Missouri. The outbreak was of unusual virulence, there being 132 deaths out of a total of 312 cases during the period from October 30 to December 31, 1921.

At the request of the State health commissioner of Oklahoma, Passed Asst. Surg. Thomas Parran was detailed on January 14, 1922, to assist in the control of a smallpox outbreak at Poteau, Okla. and near-by towns. From the original source of infection in the county jail at Poteau, there occurred 38 cases of smallpox in the city and county of Poteau, with 24 deaths. With the institution of vaccination and strict quarantine measures the outbreak was checked. The dread of the disease was so great in the near-by States that extreme quarantine measures were instituted by the local authorities in some communities against all persons and merchandise from Poteau.

On May 9, 1922, Asst. Surg. Joseph W. Mountin was detailed, upon request of the State health officer, to assist in the control of a smallpox outbreak in Hickory County, Mo. A total of about 50 cases occurred. Institution of quarantine measures and vaccinations checked the outbreak.

ANTHRAX CONTROL MEASURES.

In January, 1922, information was furnished the bureau by the Department of Health of Connecticut of one fully confirmed case of anthrax and one presumptive positive case reported among the operatives of a large brush factory in Hartford, Conn. The location of shipments of several hundred lots of the bristles and horsehair involved in these cases were traced, and in cooperation with the health officers of 17 States warnings were issued for proper precautions and thorough disinfection of these materials before use in manufacturing processes. Of the samples collected for bacteriological examination, certain lots of horsehair, but no bristles, were found to be infected with anthrax spores. This investigation was handled promptly and effectively, with practically no hardship to private concerns. No secondary cases of anthrax from the use of these materials have been reported.

Following these cases, the supervision of material suspected to be infected with anthrax was considered by representatives of the Bureau of Animal Industry of the United States Department of Agriculture and the Public Health Service. In order to maintain an effective supervision over human anthrax cases it was arranged that whenever a case of anthrax is traced directly to raw hair or other animal products, the information would be furnished directly to the Bureau of Animal Industry for investigation and such action as may be necessary. Whenever a case of anthrax is traced directly to a shaving brush, the information would be furnished directly to the Public Health Service for investigation and such action as may be deemed necessary. In each case the matter will be taken up with the State health authorities. Regulations have been passed by several State departments of health prohibiting the sale, manufacture or distribution of horsehair shaving brushes within the State.

POLIOMYELITIS.

In September, 1921, telegraphic request was made by the Department of Public Welfare of Idaho for service assistance in an outbreak of poliomyelitis in northern Idaho. Passed Asst. Surg. N. E. Wayson was detailed to confer with Dr. J. W. Almond, medical adviser of the department of public welfare in regard to the situation. It was found that 30 cases of poliomyelitis had occurred, scattered throughout the northern part of Idaho, with a 50 per cent mortality rate, the disease being almost entirely confined to children from 1 to 5 years of age. Doctor Almond and Doctor Wayson proceeded from Idaho to Spokane, Wash., close to the Washington-Idaho State line, where both acute and convalescent patients were visited. No difficulty was experienced in confirming the diagnoses. It was observed in this area also that children under 6 years of age were largely affected, the history of some intestinal trouble being common to each patient. In September 16 cases had been reported to the health officer of Spokane between the 1st and 12th of the month with 7 deaths. During July and August there had been approximately 100 cases of the disease with 30 deaths in that part of the State of Washington.

Recommendations were made that patients be quarantined for a period of 20 days and all children in the affected families be restricted, as far as possible, to their own premises. Interstate quarantine was not recommended.

SANITATION AND MEDICAL ASSISTANCE IN THE NATIONAL PARKS.

The assistance rendered the National Park Service at the request of the Secretary of the Interior in providing the necessary medical attention and improving the sanitary conditions in the national parks was continued during the past fiscal year, under the direction of Sanitary Engineer H. B. Hommon. Junior Assistant Sanitary Engineers L. D. Mars and A. P. Miller and Sanitary Inspector Carl Benson were also detailed for duty in the parks. Acting Asst. Surg. W. E. Crawbuck continued on duty at the Yellowstone National Park during the fiscal year, and Acting Asst. Surg. Grover C. Rice at the Grand Canyon National Park until November 1, 1921. Acting Asst. Surg. Harry Schnuck was detailed to the Grand Canyon in February, 1922, and remained on duty throughout the remainder of the fiscal year.

At the Yellowstone National Park sewerage systems and treatment plants were recommended early in the fiscal year for the Upper Basin, the Lake, and Canyon junctions. The general plan was approved by the superintendent of the park, but only enough money was appropriated to carry out the work at the Upper Basin. Complete plans and estimates for this work have been prepared and active construction will begin about July 15, 1922. At the Canyon junction a sewerage system and treatment plant were installed by the Yellowstone Camps Co. as recommended, and plans for a treatment plant were prepared for the Yellowstone Hotel Co.

A comprehensive survey was made of the sanitary conditions in Yosemite National Park and reports were submitted covering this work. A sewerage system and treatment plant were installed during

the year, and considerable time has been spent assisting the superintendent of the park in getting the plant in proper operating condition. A bacteriological laboratory was installed to analyze water and milk and sufficient chemical apparatus provided to test the efficiency of the sewage-treatment plant.

At Sequoia and General Grant National Parks sanitary surveys were made and reports submitted and special reports, including plans and estimates, were prepared in regard to sewage disposal and water supplies. Sewerage systems and treatment plants and new water supplies are urgently needed at both these parks and it is expected that appropriations will be available for this work during the coming fiscal year.

Sanitary surveys were made at Glacier, Mount Rainier, and Crater Lake National Parks. At each of these parks the reports submitted included inspections of kitchens, dining rooms, and other places handling food, and recommendations were submitted regarding improvements to be made in water supplies and methods of disposing of sewage and garbage.

At Hot Springs National Park a special report was prepared which contained estimates of cost and a description of a new system for collecting 500,000 gallons of hot water from the springs and cooling and distributing it to the bathhouses. This report is to be used as the basis for appropriations and plans for a new water-supply system that will be installed in the park in the near future. A set of sanitary rules and regulations were also prepared to govern the operation of the present system of collecting and cooling the hot water used in the bathhouses and hotels in the park.

A special report was prepared in regard to the water supply at the Grand Canyon National Park and a general report submitted on the sanitary conditions as a whole. As a result of the special report, the method of handling the water transported to the park in tank cars was improved so that the water is now satisfactory. Rules and regulations governing (1) plumbing and draining, (2) protection of water supplies, and (3) disposal of sewage in Yellowstone National Park were prepared in cooperation with the chief plumbing inspector of the park and approved by the Director of the National Park Service.

A special report was submitted to the Director of the National Park Service on the care and attention of Government automobile camping grounds, which was approved and transmitted to the various park superintendents.

An article on "Sanitation in the national parks" was submitted to the Nation's Health for publication.

Junior Assistant Sanitary Engineer A. P. Miller was stationed in Yellowstone National Park during the park season. He made inspections of all the dairies in the park that furnished milk to hotels, camps, other concessions, and individuals and submitted a complete report recommending improvements to be made in producing and handling the milk. Mr. Miller also examined all water supplies used in the park for drinking purposes and assisted in laying out new supplies and improving old ones. He made preliminary surveys and obtained data to serve as the basis of design for sewerage systems and treatment plants for the principal junctions in the park. A

sewage treatment plant was constructed by the Yellowstone Camps Co. under the supervision of Mr. Miller, and a system of spraying privy vaults with compound cresol solution was established by him. In addition to the activities already outlined, considerable miscellaneous work in relation to sanitation was done during the year. This included installation of cesspools at ranger stations, posting water supplies, and preliminary mosquito control work preparatory to active work along this line when appropriations are available.

Junior Assistant Sanitary Engineer L. D. Mars was on duty in Mount Rainier National Park from July 1 to September 10, 1921. During this time a thorough sanitary survey of Longmire and Paradise Valley was made and reports submitted covering sanitation work in the parks. A system of sewage disposal was installed at the entrance to the park; new garbage dumps were located at Paradise Valley; a more satisfactory garbage disposal system was installed at Longmire; mosquito control measures were established; a sanitary survey was made of the Nisqually River for a distance of about 25 miles below the park; and sewage disposal plans were prepared for Government automobile camping grounds at Paradise Valley. A topographic map was made of Longmire showing existing water mains, sewer lines, buildings, and roadways.

Sanitary Inspector Carl Benson was assigned to duty in Yosemite National Park on May 15, 1922. Mr. Benson has made regular inspections of kitchens and dining rooms of the hotels and camps; dairies and places handling milk, automobile camping grounds, and has been placed in general charge of the operation of the sewage treatment plant.

SUPERVISION OF INTERSTATE TRAVEL OF DISEASED PERSONS.

The supervision of the travel of diseased persons on common carriers in interstate traffic and the transportation of things from disease-infected localities, together with general sanitary conditions on the carriers, has been continued as provided for under the interstate quarantine regulations.

REVISION OF INTERSTATE QUARANTINE REGULATIONS.

At the beginning of the past fiscal year copies of the revised interstate quarantine regulations of the United States were made available. These regulations included not only all the requirements of and amendments to the interstate quarantine regulations of 1916 but also the pertinent requirements recommended by the Conference of State and Provincial Health Authorities in the Standard Railway Sanitary Code of 1920. The revised regulations were arranged and indexed to facilitate ready reference, and the appendices were also revised in detail.

DIVISION OF FOREIGN AND INSULAR QUARANTINE AND IMMIGRATION.

In charge of Asst. Surg. Gen. R. H. CREEL.

During the fiscal year 1922 officers of the Public Health Service engaged in the administration of the United States quarantine laws inspected 18,985 vessels and 2,081,236 passengers and crews at the continental maritime stations. At foreign and insular stations there were inspected 10,322 vessels and 1,011,280 passengers and crews destined for ports of the United States. There were 6,011 vessels fumigated or disinfected at domestic ports and 2,878 at foreign and insular stations. At the border quarantine stations there were inspected, exclusive of the local interurban traffic, 47,250 travelers.

GENERAL PREVALENCE OF QUARANTINABLE DISEASES.

Yellow fever.—Despite the very excellent control measures instituted by the International Health Board in Mexico, Central America, and South America, yellow fever foci were reported in a widely scattered area on the east and west coast of Mexico, the east coast of Central America, and on the Atlantic and Pacific coast of South America. The optimistic forecast made a few years past that yellow fever would soon be of merely historical interest in the Western Hemisphere has by no means been fulfilled, nor do the developments of the past two or three years afford much hope for the early fulfillment of that prophecy.

Mosquito-control measures on the east coast of Mexico and Central America, carried out by the International Health Board in conjunction with local and national sanitary authorities, have been of such character as to permit, during the summer of 1922, of some lessening of the restrictive measures ordinarily enforced against vessels arriving from that territory at ports of the United States. Other than a strict inspection of crews and passengers, no detention was imposed during this period against shipping from the eastern coast of Mexico. Yellow fever was reported the latter part of 1921 in the Mexican States of Vera Cruz, Sinaloa, Jalisco, Colima, Tamaulipas, and in Quintana Roo.

During the fiscal year cases were reported on five ships. In four instances the infection was contracted in Mexico; one case was on a vessel entering Pensacola from Tampico; two were on vessels from the west coast; and the fourth case was attributed to infection contracted in the vicinity of Vera Cruz. One case was in the person of an American passenger arriving at New Orleans, La., from Belize, British Honduras. A very sharp epidemic of yellow fever occurred in the latter port in the fall of 1921, but was soon controlled by appropriate measures. While cases reported from Mexico have never been great in numbers, their widespread distribution and the continued reporting of individual cases lead to the conclusion that all

cases have not been recognized or reported and make imperative a continual watchfulness on the part of the quarantine officers at United States ports against travelers and shipping from Mexico.

During the summer of 1921, many cases were reported from a widely scattered area in Peru; and in the early part of 1922, the infection was reported in Brazil, more especially the seaports of Bahia and Pernambuco.

Plague.—Bubonic plague continued to be reported from practically every section of the globe, and in many of the important seaports having commercial relations with the United States. While control measures have prevented the appearance of the infection in the human population in Vera Cruz and Tampico, the occasional reporting of rodent plague in those ports necessitates the enforcement of strict precautions against the introduction of the infection into United States ports. Appropriate safeguards such as the fumigation of vessels, the fending off of ships, and the rat guarding of lines, were carried out, either at the port of departure or at the port of arrival. The continued presence of the infection at Tampico and Vera Cruz constitutes a very serious cause for concern because of the extensive maritime trade between these two ports and southern ports of the United States.

As in previous years, Guayaquil continued to be an endemic center, and many human cases of plague were reported in that city.

The infection was also reported from Peru, Chile, and Brazil. Portugal, the Azores, Cape Verde Islands, Italy, Greece, and the North African coast all reported plague infection at varying periods and in various ports. India continued to be a reservoir of infection in the Orient, and a number of ships from Indian ports were reported as plague infected either en voyage or at port of arrival.

Plague broke out in Sydney and Brisbane after a period of freedom from the disease of several years, and in Hongkong a rather severe epidemic prevailed throughout the year, with no signs of abatement.

Despite the arrival at ports of the United States of a large number of vessels from plague-infected ports, the infection was successfully excluded. This result can be attributed to the effective fumigation of vessels, either at the port of departure or at the port of arrival in the United States, by, or under the supervision of, the Public Health Service.

The spread of plague is more difficult to prevent than that of any other quarantinable infection, since it is primarily a disease of rats and may exist undetected in a port—confined to the rodent population, with only occasional human case, its presence unknown to the authorities—or its presence deliberately suppressed to avoid commercial prejudice against the port. Under such conditions it is easily conceivable that infected rats accidentally imprisoned in articles of cargo from an infected warehouse in ports not known to be infected may be carried to outside points.

The history of plague extension clearly indicates that the infection spreads into clean territory, not by means of the traveling public, but through infected rats hidden away in cargo, or, and less frequently, by a migratory rat from an infected vessel. The only measure that seems to promise successful exclusion of plague from seaports is the systematic fumigation of vessels with a view of main-

taining them as nearly as possible in a rat-free condition. The United States quarantine regulations provide not only for the fumigation of vessels coming direct from infected or suspected ports, but also that all vessels regardless of their previous itinerary must be fumigated at least once in six months.

The report of Surgeon Simpson, in charge of the San Francisco quarantine station, to the effect that no rats were found on 345 vessels out of a total of 783 gives considerable encouragement to the expectation of effecting a relative rat-free condition of the bulk of vessels plying between foreign ports and the United States. For the prevention of the introduction of plague, 6,721 vessels from foreign ports were fumigated at the United States quarantine stations, and 2,090 under the supervision of service representatives at foreign ports.

Typhus.—Typhus prevailed in many sections of the world, but its presence in epidemic proportion in Mexico and in eastern and south-eastern Europe was of the most concern to quarantine officers, on account of the large number of travelers arriving in the United States from those areas. The infection continues endemic in the plateau region of Mexico, although by no means as seriously as in previous years. Strict precautions were enforced on the border against the introduction of the disease.

While cases were reported in most of the European countries, the greatest ravages occurred in Poland, Russia, and Turkey. As travelers from those territories left Europe by way of many ports, preventive measures were enforced at all seaports under the supervision of officers of the Public Health Service attached to the American consulates. Measures of delousing persons infested, and detaining them at ports of embarkation, were wholly effective; and it is noteworthy that among the many thousand travelers from the typhus-infected areas of Europe, only one case of typhus reached the American shore, the only instance wherein the infection evaded the sanitary barrier erected by the Public Health Service at European ports of embarkation. Other than this no infection was reported on vessels sailing for America—a very decided contrast to the previous year, when some 11 vessels infected with typhus arrived at United States ports.

Cholera.—From a sanitary viewpoint cholera constituted much less of a menace to the United States than yellow fever, plague, or typhus, but because of its prevalence in eastern Europe there was constant apprehension lest the infection extend to the western European seaboard. In the latter event the disease would become immediately threatening and would necessitate the application of preventive measures at ports of embarkation as well as stricter surveillance on the part of the American quarantine authorities.

A few cases were reported in Poland, chiefly among travelers from Russia. In the latter part of the fiscal year a number of cases appeared in the Balkan ports and in Turkey, with indications of serious danger of its spread to the westward. Reports from Russia were fragmentary and irregular, but in various sections of that country cholera appeared in epidemic proportion. As in former years, numerous foci were reported in the Orient, chiefly in the Philippines, India, and Indo-China. One vessel arrived at New York with a history of a case en route; appropriate measures were applied at the quarantine station.

Smallpox.—A virulent type of the disease, involving hemorrhagic and confluent lesions, continued to prevail in Mexico; and to prevent its introduction into the United States incoming travelers from that section were vaccinated unless presenting evidence of immunity by recent vaccination or a previous attack of the disease. During the year 74,833 persons were vaccinated at different ports on the Mexican border.

A milder type of the disease prevailed in the West Indies, attributable in numerous instances to the spread of the infection from Jamaica, where it was regarded as a separate clinical entity, known locally as "alastrim."

A rather serious epidemic of smallpox also broke out in the Orient and necessitated the enforcement of vaccination at ports of embarkation of travelers destined to the United States or its insular possessions.

INTERNATIONAL SANITARY CONVENTION.

Preliminary conferences were held by representatives of the various countries signatory to the International Sanitary Convention of 1912, at the International Office of Public Hygiene, Paris, France, for the purpose of formulating a tentative draft of a revision of that treaty. A provisional agreement has been reached by this body for various modifications of the existing treaty.

It is contemplated that typhus fever will be incorporated as a reportable disease in the revised convention. A rodent survey of ports is proposed, but notification as to results is to be made only to the International Office of Public Hygiene for dissemination of the information and not to the diplomatic or consular representatives of the other countries signatory to the convention. Provisions are also to be included for the treatment at ports of arrival of ships and personnel from a typhus-infected port. It is also proposed that each country shall systematically collect rats from infected areas and examine them bacteriologically for a period of six months after the reporting of the last infected rat and that reports thereof shall be furnished to the International Office of Public Hygiene.

These provisions are all distinct improvements over the existing convention, but the tentative agreement arrived at failed to include a number of modifications supported by the Public Health Service.

Typhus was not made notifiable in the same way as plague or cholera, notification not being required until the disease had spread beyond the original focus.

No provision was made for the consideration of a port as plague-infected primarily because of rodent plague, but only in the presence of reported *human* cases.

No measures are applicable against a port known from unofficial authentic information to be infected, such measures being applicable only after the information has been received from official sources in the manner now prescribed.

The present provisions stand whereby a port shall be regarded as noninfected 10 days after the last human case, this in contrast to the recommendation made by the Public Health Service that a port should be considered infected by plague until 1 month shall have elapsed since the discovery of a plague-infected rat, intensive catch-

ing of rats and their bacteriological examination being practiced in the meantime.

According to the proposed text no examination for carriers is authorized against personnel from cholera-infected ports unless there has been a case of cholera on board ship—i. e., reported by the physician or master of the vessel.

The two most important changes urged by the American delegate as corrective of existing defects were subject to considerable debate, but were rejected. These were the application of preventive quarantine measures based on information from authentic but nonofficial sources and the official notification as to rodent plague and the classification of a port as infected because of rodent plague, even in the absence of *reported* human cases.

In brief, the proposed text for revision contains, as does the existing treaty, essential defects, both of a negative and a positive nature. It is at variance with the United States quarantine regulations and administrative procedure of our quarantine system, and if adhered to by the United States Government, the Public Health Service will either have to ignore certain quarantine practices as provided in the quarantine regulations, or disregard the terms of the convention.

The main defects of a negative nature of the existing convention, as well as the proposed text of revision, include disregard of the rôle of the cholera carriers in the transmission of cholera, and the classification of a ship as "healthy" (instead of "suspected") in the absence of human cases on board, or proven plague-infected rats taken on a ship, even though the vessel comes from a plague-infected port and has taken no precaution for preventing access to rats.

The classification in the treaty as to "infected," "suspected," and "healthy" ships from plague ports is, in the light of past experience, highly objectionable. Within the past 20 years there has not arrived at a port of the United States (exclusive of insular possessions) a vessel with a case of human plague on board, and yet plague has been introduced into Porto Rico (twice) and into New Orleans, La., Pensacola, Fla., Beaumont and Galveston, Tex., and San Francisco, Calif. The infection, of course, was transmitted through infected *rats* and on "healthy" vessels from plague-infected ports. In other words, it is the "healthy" vessel from plague-infected ports that has constituted a menace to the United States, and not "infected" or "suspected" vessels. The existing convention, as well as the proposed revision, however, minimizes the sanitary menace of a "healthy" vessel and provides for fumigation only "in exceptional cases."

Another objectionable feature in the proposed revision is contained in the definition of the words "surveillance" and "observation;" "surveillance" contemplating that the personnel be released and merely subject to casual inspection by local authorities, and "observation" being to include isolation and inspection at quarantine stations. For instance, in article 26, it is provided, as regards a vessel on which has occurred a case of cholera, that "the crew and passengers may be subjected to surveillance"—this in contrast to "observation." This treatment would contemplate that the vessel be given immediate pratique and passengers proceed to their destination, subject to super-

vision by local authorities. "Surveillance" is also permissive with respect to yellow-fever contacts and typhus contacts.

The plague status and treatment of a ship depend upon the appearance of human cases on board or the reporting of rodent plague on board. Human cases are largely of academic concern to the United States Government, since the service attaches but relatively slight importance to such cases as a means of spreading the disease, except in so far as they may indicate the source of rodent infection. The human case does not necessarily indicate an infected ship, although article 20 is predicated on such an assumption.

Formal consideration of the proposed draft will probably be made by representatives of the various Governments within the next year; but unless some of the existing defects are remedied, it seems probable that this Government should, in ratifying the convention (when, and if, made), insert a reservation in order to properly safeguard its interests. The most serious defect of the existing convention rests in the fact that quarantine action by the various signatories is to be predicated on information received from the authorities of the infected countries. Experience in the past, however, indicates that in only rare instances such sanitary data are transmitted in the manner prescribed, and the knowledge of infection in foreign countries not infrequently is obtained through the arrival of infected vessels or through information appearing in the public press.

FUMIGATION OF VESSELS.

One of the functions of a quarantine station that is the most difficult to apply in an effective manner is that pertaining to the fumigation of vessels for the destruction of rodents. For many years chief reliance was placed on the fumigation of vessels by sulphur dioxide, the sulphur being burned in varying proportions so as to produce from 2 to 4 per cent sulphur dioxide.

In general, it was assumed that this procedure was effective, but an investigation (1915-16) made at New Orleans by the conjoint efforts of the plague eradication force and the quarantine station, covering a period of one year, very clearly demonstrated that sulphur dioxide was scarcely more than 50 per cent effective when used in holds of vessels, loaded or partially loaded, or in superstructures containing stores or similar articles that would afford cover for rodents. It was ascertained by subsequent trapping of vessels that under such conditions almost one-half of the rats would escape destruction. It was made clearly evident that sulphur was not an effective fumigant except in empty compartments. Furthermore, sulphur dioxide is objectionable in the fumigation of vessels because of the fire hazard, its destructive effect on fabrics and metal work, and the prolonged exposure required, which is obstructive to commerce.

Although the deadly nature of hydrocyanic acid gas had been known for many years, and had been used under certain conditions for the destruction of insect pests, it had never been employed prior to 1915 as a routine measure in the destruction of rodents, because of the very great danger to human life incident to its use. This agent was employed, however, by the Public Health Service for the deratization of cargo in Porto Rico in 1913, in connection with anti-

plague measures, and its utility and practicability for this purpose were fully demonstrated.

When plague-control measures were instituted by the Public Health Service in New Orleans in 1914, cyanide gas was employed on a large scale, and steps were taken to effect a standard, both as to the strength of the gas and time of exposure, when used for the destruction of rats, fleas, lice, bedbugs, mosquitoes, and other insects; and certain safeguards were later on devised and incorporated in the United States quarantine regulations for the protection of fumigators and crews of vessels.

The provisions in the United States quarantine regulations as to the enforcement of precautions for the safeguarding of human life in the fumigation of vessels with cyanide gas are believed to be entirely adequate if observed by the fumigating force. The experience of the Public Health Service in the past four or five years makes it clearly evident that despite admonitory instructions, fatalities occur, due either to carelessness or disregard of the regulations on the part of the fumigating force. Considering the fact that several thousand vessels are fumigated at various quarantine stations throughout the course of the year, an occasional fatality might be condoned as an unavoidable "industrial hazard," but the bureau has not regarded the situation in any such manner and has been of the opinion that all danger to human life could be eliminated, and that safeguards automatically operative should be devised.

From time to time consideration has been given to the utilization of a fumigating gas which, by reason of its odor or other physical property, would give adequate warning to persons entering a compartment of a vessel which still retained cyanide gas in lethal strength. Investigations were made in conjunction with the Chemical Warfare Service as to the practicability of adding a percentage of chloracetophenone, one of the best known of the lacrimatory gases. The results, however, were unsatisfactory, as the "tear gas" was entirely too persistent and remained long after the cyanide had been dissipated. Furthermore, it was not sufficiently diffusive to penetrate into various parts of the spaces fumigated.

More recently, however, a board was appointed, composed of service officers operating in the industrial hygiene section of the Division of Scientific Research, for the purpose of making additional investigations along these lines. The personnel of this board has been conducting an investigation in conjunction with the Chemical Warfare Service and appear to have developed a fumigating gas equally satisfactory in every respect to hydrocyanic acid gas, but with the additional advantage of being lacrimatory and producing a sufficiently irritating effect to prevent access by the ignorant or careless to a compartment in which the gas remains in lethal quantities. Further research will be followed out before any definite determinations can be made as to its practicability as a fumigating agent.

The fumigant under consideration is a composite gas consisting of 3 parts of cyanogen chloride and 1 part of hydrocyanic acid gas, generated by the combination of 4 ounces of sodium cyanide, 3 ounces of sodium chlorate, and 17 ounces of commercial hydrochloric acid. For the purpose of reducing fire and explosion hazards, 2 ounces of talc should be added to this quantity of chemicals. In the

above proportions per 1,000 cubic feet of space, the toxicity of the gas generated corresponds to the present standard of 5 ounces of sodium cyanide per 1,000 cubic feet of space. Although this method promises an automatic protection, it is not contemplated that any of the safeguards at present in force with respect to cyanide fumigation shall be abandoned.

The sanitary authorities of foreign nations have been rather reluctant to adopt cyanide fumigation, because of the risk to human life. In 1920, however, the Italian authorities initiated the practice and have extended its use in maritime quarantine procedure; during the past year Great Britain has also adopted the process; and as its various points of superiority over sulphur fumigation become recognized, both by sanitary authorities as well as the commercial interests, there seems to be no doubt that it is merely a question of time when fumigation by hydrocyanic acid gas or a similar fumigant will supplant the use of sulphur, which has been used for fumigating purposes for more than 400 years.

SERVICE OPERATIONS AT EUROPEAN PORTS.

Service *representatives* were attached to the American consulates in European ports, as in the former year, to supervise the application of the United States quarantine regulations against vessels and personnel destined for ports of the United States. Whenever it was practicable, vessels were fumigated for the destruction of rodents, under the supervision of a service officer, and a certificate was issued that served to eliminate the refumigation of the vessel upon its arrival at a United States port. To a considerable extent this has served to relieve domestic quarantine stations of a substantial amount of fumigating work.

The most important aspect of the European work, however, has been in the application of measures to prevent the extension of typhus in travelers from the typhus-infected areas of eastern Europe who are proceeding to the United States. All such persons are subject to inspection prior to embarkation and are required to be demonstrably free of vermin, and, when necessary, are detained at the port of embarkation so that a period of 14 days would intervene between their departure from a typhus-infected area and their arrival at a United States port. All measures for disinfection were carried out by representatives of foreign governments, or by private agencies employed by the steamship companies, the work being done under the supervision and to the satisfaction of the Public Health Service officer assigned to the consulate.

Asst. Surg. Gen. Rupert Blue had general charge of all service activities in Europe, with headquarters at Paris, France, from which central point he coordinated the activities of the various officers and at intervals made personal inspection of the various stations.

During the fiscal year this branch of the service inspected 1,985 vessels and 318,700 travelers, and supervised the disinfection of 155,455 persons. Not only was typhus successfully excluded from the United States, but so effective were the measures employed that infection was reported on only one vessel en route, in sharp contrast to the experience of the preceding year when some 11 vessels infected with typhus arrived at United States ports. The procedure,

therefore, was not only highly protective to the public health of the United States, but was of the utmost value to commerce in eliminating delays and burdensome expense incident to the detention of vessels and passengers upon arrival at domestic ports.

FLOATING EQUIPMENT.

Launches, secured from the Army and Navy, were added to the floating equipment at the following stations: Portland, Me.; Boston, Mass.; New York, N. Y.; Hampton Roads, Va.; Savannah, Ga.; Tampa Bay, Fla.; Galveston, Tex.; and New Orleans, La. At Honolulu, a contract was let for a 60-foot launch. Repairs were also made on some of the launches. The steam tugs *Von Ezdorf* and *McClintic* were transferred to New York.

On account of the saving, it is believed that oil-burning engines should be installed on all the large vessels as rapidly as the present motive power on those vessels wears out.

The condition of the floating equipment at the stations is excellent and promises a substantial reduction in expenditure for repairs and upkeep.

IMPROVEMENTS TO QUARANTINE STATIONS.

During the year, plans were perfected and contracts let covering the expenditure of an appropriation of \$150,000 at the Boston quarantine station. Provisions were made for the enlargement of the barracks, a power plant, additional quarters for personnel, and increased disinfecting facilities. When these plans shall have been completed, the Boston quarantine station will have a capacity for handling 2,000 persons.

An appropriation of \$500,000 was provided by Congress for the fiscal year 1922, to be expended at the New York quarantine station for additional barracks, a small general hospital, extension of the water supply and electric current from Staten Island to Hoffman Island, a new power plant, mainly for heating purposes, a complete laundry and a garbage incinerator, all at Hoffman Island; and at Rosebank, four sets of officers' quarters, the enlargement of the wharf, and an electric lighting system. When these projects shall have been completed, there will be facilities at Hoffman Island for the detention and treatment of approximately 3,500 persons, which, it is believed, will be ample for the quarantine necessities at New York and sufficient to meet any emergencies.

At the Baltimore quarantine station extensive repairs were made to the wharf, a new heating and lighting system was provided, and additional quarters for the junior medical officer.

Additional fire protection was provided for the Cape Fear quarantine station.

An electric lighting system and ice manufacturing machine were provided for the New Orleans quarantine station, and steps taken to provide for the electrification of the Mobile, Savannah, and Portland stations. On account of the extraordinary fire hazards obtaining at most of the stations, and their isolation, which precludes assistance from outside agencies, it is believed that the electrification of the remaining quarantine stations should be effected at an early date.

At the Mobile quarantine station and at San Juan, Porto Rico, and Craney Island marine ways were constructed to facilitate the repair and preservation of floating equipment. This is an economical arrangement for stations having small launches, but it is not practical with respect to stations with larger vessels.

Substantial improvements were made in the laboratories at the Boston and Hampton Roads stations, and similar improvements are contemplated at other quarantine stations, more especially to provide adequate facilities for the examination of rodents destroyed in the fumigation of vessels.

TEXAS BORDER QUARANTINES.

On account of the prevalence of smallpox of a malignant type in Mexico, and numerous foci of typhus and yellow fever, the operations of the service at El Paso, Laredo, Eagle Pass, Brownsville, Rio Grande City, and the smaller ports were of great importance. Special care was exercised in preventing the introduction of these infections. The inadequacy of the border patrol in preventing clandestine entry at unguarded points along the border, as described in the previous annual report, remains unremedied, and, to a considerable extent, nullifies the efforts of the Government forces engaged in enforcing quarantine, customs, and immigration laws, and in a similar manner weakens the activities of the Government with respect to the enforcement of the prohibition law and the antinarcotic law.

In order to reinforce the measures carried out at the quarantine stations, the Public Health Service, in cooperation with State and local agencies, carried out work in various cities and towns along the Rio Grande to control mosquito (*stegomyia*) breeding. The results secured in this work, especially at Laredo, were exceptionally gratifying and very effective.

Statistical data of quarantine transactions on the Texas-Mexican border for the fiscal year ended June 30, 1922.

Title.	Brownsville.	Eagle Pass.	El Paso.	Hidalgo.	Laredo.	Presidio.	Rio Grande City.	Terlingua.	Total.
Number inspected from interior Mexico.....	6, 102	2, 387	18, 250	7, 285	11, 658	830	197	54	47, 250
Number local passengers inspected.....	671, 386	714, 924	1, 828, 906	11, 666	1, 026, 708	7, 720	11, 935	3, 331	4, 276, 576
Total number persons.....	202	10, 295	76, 569	.....	4, 035	.....	97	5	82, 003
Total number persons passed without treatment.....	674, 590	707, 016	1, 770, 552	18, 646	1, 006, 429	7, 290	11, 497	3, 285	4, 199, 305
Total number persons vaccinated.....	2, 861	2, 697	35, 183	277	31, 375	1, 255	605	580	74, 833
Total number of sick held for observation.....	.....	.....	.....	.....	8, 776	.....	4	.....	8, 780
Total number of sick refused admission.....	37	.....	35	28	.....	5	26	2	133
Total pieces baggage disinfected.....	1, 343	12, 262	5, 998	.....	562	678	135	.....	20, 978
Number of cases typhus fever from July, 1921.....	.....	.....	1	.....	.....	.....	.....	.....	1

RECOMMENDATIONS.

The ports of Lake Sabine, including Port Arthur, Orange, Beaumont, Port Neches, and Sabine, are not provided with adequate quarantine facilities. The service at present maintains a force at Sabine Pass for the inspection of vessels from foreign ports and their fumigation when necessary. On account of the commercial activities of this area, and the trade of these ports with so many foreign ports where quarantinable diseases prevail, it is believed that a well-equipped quarantine station should be provided at Sabine Pass, and to this end appropriate recommendations have been submitted to the department.

In previous years recommendations have been made to Congress for the establishment of adequate quarantine facilities at Sand Island, located in Mobile Bay, adjacent to the city, as the existing facilities near Fort Morgan are wholly inadequate. The station is expensive to maintain on account of the repeated damage from storms, and is somewhat lacking in efficiency because of the difficulty in securing satisfactory personnel. At present the facilities at the Mobile quarantine station, located near Fort Morgan, permit of nothing more than the inspection of incoming vessels.

Under the terms of a lease with the harbor board at St. Thomas, Virgin Islands, the service is operating the St. Thomas quarantine station. The lease contains a provision for the purchase of this station by the United States Government, in conformity with the authority conferred on the Secretary of the Treasury in section 5 of the act approved June 19, 1906. The property in question is owned by the harbor board, which has certain financial obligations to discharge, and unless the station be purchased by the Government it is not improbable that it will be disposed of to commercial interests. The property is held at a very reasonable sum, and every effort should be made to procure the requested appropriation, in amount \$15,000.

VIOLATION OF QUARANTINE LAWS.

During the fiscal year the department passed on 380 cases involving violation of the act of February 15, 1893, pertaining to the failure of masters to present an American consular bill of health.

Three hundred and twenty-eight cases were dismissed without penalty because of extenuating conditions, due in some instances to lack of American consular representatives at the port of departure and in other cases to the diversion of the vessel from its original port of destination. The total amount of fees collected was \$4,785. The violations reported were approximately one-half the number of those of the previous year, and the improvement is believed to be due to the more careful enforcement of the law in recent years and the imposition of substantial fines in those cases presenting no extenuating circumstances.

TRANSACTIONS AT NATIONAL QUARANTINE STATIONS FOR THE FISCAL YEAR ENDED JUNE 30, 1922.

The following tables summarize the transactions at the national quarantine stations for the fiscal year:

Transactions at continental national quarantine stations for the fiscal year ended June 30, 1922.

Stations.	Vessels inspected.	Vessels fumigated.	Passengers and crews inspected.
Alexandria.....			
Atchafalaya (Morgan City).....			
Baltimore.....	678	321	27,551
Beaufort.....	0	0	0
Biscayne Bay.....	347	0	14,886
Boca Grande.....	8	1	220
Boston.....	774	145	47,667
Brownsville ¹			6,102
Brunswick.....	36	8	674
Cape Fear.....	24	5	826
Cedar Key.....	0	0	0
Charleston.....	212	41	7,868
Columbia River.....	198	167	9,143
Coos Bay.....			
Cumberland Sound.....	57	0	1,547
Darien.....			
Delaware Breakwater.....	5	0	89
Eagle Pass ¹			2,387
Eastport.....	352		26,794
El Paso ¹			18,250
Enreka.....	9	0	0
Fort Bragg.....			
Freeport.....	52	0	1,760
Galveston.....	914	148	33,209
Georgetown.....			
Gloucester.....	17	0	109
Gulf.....	69	21	1,179
Hampton Roads.....	1,361	503	71,339
Hidalgo ¹			7,285
Hoquiam.....	41	20	1,506
Ketchikan.....	85	0	7,427
Key West.....	253	9	21,291
La Jita ¹			217
Laredo ¹			11,658
Marcus Hook.....	1,119	349	13,089
Mobile.....	473	126	11,759
Monterey.....			
New Orleans.....	2,213	447	97,436
New Orleans City.....		757	
Newport.....	9	0	549
New York.....	4,928	1,483	912,178
Pascagoula.....	22	7	165
Pensacola.....	401	133	2,090
Perth Amboy.....	31	6	857
Port Angeles.....	24	3	372
Port Aransas.....	37	0	853
Port Harford.....	15	0	523
Portland.....	124	33	8,995
Port Townsend.....	283	55	27,391
Presidio ¹			830
Providence.....	134	0	9,527
Rio Grande City ¹			197
Sabine.....	918	² 380	29,427
St. Andrews.....	42	11	503
St. Georges Sound.....			
St. Johns River.....	130	26	3,169
St. Joseph.....	10	0	74
San Diego.....	757	3	5,411
San Francisco.....	605	578	79,160
San Pedro.....	715	19	518,076
Santa Helena ¹			324
Savannah.....	144	27	4,799
Seattle.....	59	121	10,299
South Bend.....	4	3	191
Tampa Bay.....	298	55	6,235
Vineyard Haven.....	2	0	23
Washington, N. C.....			
Total.....	18,985	6,011	2,128,486

¹ Border station. Statistics do not include "local" travelers, who, however, were subjected to cursory inspection. Through travelers were given close examination.

² Includes 82 vessels fumigated at Port Arthur in connection with outgoing quarantine.

ANNUAL TRANSACTIONS AT CONTINENTAL AND INSULAR QUARANTINE STATIONS FOR THE FISCAL YEAR ENDED JUNE 30, 1922.

[Total ¹ inspections: Vessels, 21,870; crew, 1,680,323; passengers, 771,480. Total personnel inspected, 2,451,803. Vessels passed on certificate of ship's medical officer, 456.]

Vessels detained for observation or treatment (detention for purposes of inspection only not included).

	Nature of infection.							Total.
	Yellow fever.	Rodent plague.	Human plague.	Small-pox.	Ty-phus.	Chol-era.	Lep-rosy.	
Vessels from infected ports ²	155	5,414	19	75	65	.....	5	5,733
Infected vessels ³	1	.....	1	15	5	2	9	33
Number of cases ⁴	1	.....	1	13	3	.....	9	27
Number of crew detained.....	3,403	.....	609	494	122	73	113	4,814
Number of passengers detained.....	70	.....	1,216	989	768	.....	76	3,119
Personnel disinfected.....	.....	.....	.....	205	4,429	.....	189	4,823
Personnel examined bacteriologically or vaccinated.....	54	.....	.....	2,068	709	121	2	2,954
Vessels fumigated: ⁵								
HCN.....	38	3,807	6	2	1	.....	.....	3,854
SO ₂	8	2,714	13	6	1	.....	3	2,745
HCN and SO ₂.....	.....	200	.....	.....	.....	.....	.....	200

¹ An inclusive figure, regardless of treatment or report elsewhere.

² Refers to vessels held for observation when from an infected or suspected port, with no cases en route or on arrival.

³ Vessels with cases on board at arrival or reported en route.

⁴ Includes carriers.

⁵ Includes microscopical examinations of blood, excreta, tissue, etc.

⁶ Includes vessels fumigated after passing quarantine in accordance with provisional pratique.

REMARKS: Two vessels were disinfected with steam for destruction of vermin.

Number of rats destroyed on ships, 23,448; rats examined, 9,759.

REPORTS FROM STATIONS.

Baltimore (Md.) quarantine.—Acting Asst. Surg. T. L. Richardson in charge. Post-office and telegraphic address, Curtis Bay, Baltimore, Md.

During the current fiscal year this station was concerned in the handling of quarantinable diseases as follows:

Smallpox: The American steamship *Birmingham City* arrived at this station November 3, 1921, from Rio de Janeiro, Brazil, via Barbados, British West Indies (10 days from Barbados), with a convalescent case of smallpox in the person of a negro workaway passenger, who was taken on board at Barbados. The vessel and the patient's effects were disinfected and the crew were vaccinated.

"Alastrim" or "kaffir-pox": The Norwegian steamship *Mandeville* arrived at this station May 1, 1922, from Port Antonio, Jamaica, with 21 negro stowaways on board, 6 of whom were suffering from "Alastrim" or "kaffir-pox." The other 15 suspects were removed to the hospital for observation and treatment as for smallpox. The 15 suspects—7 of whom had been previously vaccinated, the other 8 being vaccinated at the station—were returned to the vessel on her outward trip, May 3, 1922; the other 6 were detained until they had entirely recovered.

Pursuant to bureau orders, the name of the tug *Neptune* was changed to that of *Walter Wyman*, and the 40-foot launch was designated the *Grube*.

The bed capacity of the reservation at the time of this report is 144. If the necessity should arise, bunks could be erected in tiers of three, which would increase the capacity to 375.

The congressional appropriation of \$25,000 for improvements to the reservation was utilized in constructing a new wharf, erecting a new water tank, installing new (heating) boiler for the quarters of the medical officer and assistant medical officer, constructing a new kitchen to the administration building (used as quarters of the assistant medical officer), bringing electric current to and installing electric lighting system on the reservation, installing a water-treatment system, a new heating system for attendants' quarters, constructing a new fence around the reservation; and for repairs to gutters and down spouting, the painting of buildings, and miscellaneous repairs.

Boca Grande (Fla.) quarantine.—Post-office address, South Boca Grande, Fla.; telegraphic address, Boca Grande, Fla. P. L. McAdow in charge.

During the year eight vessels were inspected, one of which was fumigated for the destruction of rats. These vessels had a total personnel of 220, of whom 219 were crew and 1 was a passenger. No quarantinable diseases were noted throughout the year.

Boston (Mass.) quarantine.—Surg. Paul Preble in charge. Post-office and telegraphic address, Gallops Island, Boston, Mass.

Surg. William M. Bryan, in charge at the beginning of the year, was relieved from duty and Surg. Paul Preble assumed charge on July 30, 1921.

QUARANTINE ACTIVITIES.

During the year 774 vessels were boarded and a total of 47,667 persons inspected for the detection of quarantinable diseases. Of this total 38,791 were officers and crew and 8,876 were passengers. There were 125 vessels fumigated under the provisions of paragraph 103, Quarantine Regulations, 1920, requiring periodic fumigation, and 20 vessels were fumigated upon request of agents or owners.

All steerage passengers arriving during the year were subjected to an intensive medical inspection, particularly for the detection of *Pediculi* as a possible means of the transmission of typhus fever. A total of 373 persons were transferred to the station by the tug *Vigilant* and deloused. Practically all these passengers were from Mediterranean ports.

RODENT EXAMINATION.

Acting Asst. Surg. Paul Eaton was assigned to duty at this station on May 6, 1922, to supervise laboratory examinations and studies of rodents in this vicinity in cooperation with State and local health authorities. The purpose of these studies is to determine the possibility of the existence of plague in rodents trapped ashore or taken from fumigated vessels. Special studies are also contemplated.

Building No. 15 is being remodeled and repaired to make it available for laboratory work. All necessary laboratory apparatus and equipment have been purchased.

REPAIRS AND PRESERVATION.

Many repairs and improvements have been made with station labor during the year. A new storehouse, much needed for the storage of lumber and other material, was built from material contained in two

old sheds located at the lower end of the island. Roads have been repaired and rebuilt, with cement gutters added, and all manholes have been reboxed with reinforced concrete. A tile and rock drain has been extended entirely around the large group of barracks, with laterals to manholes and laboratory, in order to abate a mosquito nuisance and remove ground water.

Plans and specifications have been completed for extensive repairs and alterations, provided for by a special appropriation of \$150,000. This work was started on June 26, 1922. Extensive remodeling and enlargement of existing barracks near the wharf will provide detention rooms for about 2,000 untreated persons, and two independent bathing units with noninfected detention space for approximately 1,000 persons. A new sleeping barracks will be added to the present large barracks group, providing a total sleeping capacity for approximately 1,200 persons. A central power house will be built for steam boilers, electric generating equipment, and laundry. An existing building, previously used as a hospital, will be remodeled into sleeping quarters for emergency personnel.

In addition to these repairs and alterations other items deserve immediate consideration. A new motor-driven salt-water fire pump is needed in order to provide adequate fire protection. The sea wall on the west side should be rebuilt for a distance of approximately 250 feet. Minor repairs to the wharf are necessary, and a breakwater should be built to better protect station vessels when lying at the wharf. Other minor repairs and new construction are also urgently needed.

Brownsville (Tex.) quarantine.—Acting Asst. Surg. George D. Fairbanks in charge.

During the current fiscal year this station was concerned in the usual quarantine activities to prevent the importation of disease into the United States from Mexico. The specific diseases concerned are smallpox, yellow fever, typhus fever, bubonic plague, and leprosy, none of which has entered so far as known. Continuous vaccination has been very effective in preventing the introduction of smallpox into Brownsville and vicinity. Four lepers were denied admission. There is through train service between Mexico City and Tampico and points in the United States, all trains of which are inspected by the medical officer for insanitary conditions and diseased passengers. The number of local passengers entering during the year was 671,349, and those from the interior, 6,102. There were 2,861 persons vaccinated.

The personnel consists of an acting assistant surgeon, five inspectors, and a matron.

Brunswick (Ga.) quarantine.—Acting Asst. Surg. R. E. L. Burford in charge. Post-office and telegraphic address, Brunswick, Ga.

During the current fiscal year there were inspected at this station 36 vessels from foreign ports, 8 of which were fumigated with sulphur dioxide for destruction of rodents. No quarantinable disease was noted among crews (numbering 674 men). Fifty-eight rats and 12 mice were found dead in holds and compartments of vessels after fumigation.

One case of smallpox was removed from the U. S. dredge *Creighton*. The dredge and attending tug *Brunswick* were disinfected, the crews vaccinated, and the vessels allowed to proceed with their work of dredging in the harbor, but were kept under observation 14 days subsequent to last exposure. There were no subsequent cases.

Columbia River (Oreg.) quarantine—Post-office address Astoria, Oreg. Surg. H. M. Manning in charge.

During the fiscal year one ship entered with quarantinable disease on board. The Japanese steamship *Brazil* arrived December 28, 1921, from Kobe and Muroran with one of the crew presenting a mild case of smallpox. The vessel was sent to the quarantine station. The sick man was isolated, every member of the crew was vaccinated, and the crew's effects and quarters were disinfected.

The ship was released January 4, with all the crew who had good vaccinations. Two contacts were held until the vessel left Astoria outbound.

On March 30, a telegram was received from Passed Asst. Surg. N. E. Wayson, stating that the steamer *Lurline*, which runs between Astoria and Portland, had a case of smallpox taken off at Portland by the city health department. Twenty-eight of the crew of this steamer were vaccinated at Astoria.

During the year 198 vessels were inspected, as compared with 104 during the previous year; and of these, 167 were fumigated, as contrasted with 69 fumigated during the previous year. There were 620 rats found after fumigation.

El Paso (Tex.) quarantine.—Passed Asst. Surg. J. W. Tappan in charge.

Vaccination against smallpox has been continued as heretofore. There has been an attendant on duty for this purpose at all hours the port is open for traffic. Although smallpox has been constantly present in the State of Chihuahua, Mexico, and several cases among arriving aliens were detected at the quarantine station, the incidence of smallpox in El Paso during the past year has been materially decreased over previous years.

As a precautionary measure against bubonic plague, and in conjunction with the campaign against the pink bollworm that is being vigorously carried on by the Department of Agriculture, all freight cars coming from Mexico have been fumigated with hydrocyanic acid gas.

Bathing and delousing methods against typhus have been strictly enforced. Active cooperation has been rendered by State, county, and city health officers in typhus preventive measures in El Paso. As in previous years, passengers from the neighboring settlements about Juarez, or those from the interior of Mexico, who are demonstrably clean and not louse-infested, are permitted to pass without going through the disinfecting plant; but all immigrants corresponding to the steerage class at the large seaports of entry are required to bathe, have their clothing and baggage disinfected (deloused), and submit, if necessary, to vaccination. The working classes from Juarez known as "locals" are required to pass through the plant once a week. A bath certificate is issued to these and taken up after eight days, a new one being issued after each disinfection.

During the year, improvements made at the disinfecting plant included repairs to the bath rooms, the erection of a double cyanide chamber, and enlargement of the plant generally to permit the installation of a new steam sterilizer. A double sterilizing plant now exists, consisting of two steam sterilizers and two boilers, in order that the plant may not have to shut down at any time for repairs to either unit.

Galveston (Tex.) quarantine.—Passed Asst. Surg. Paul D. Mossman in charge.

No cases of quarantinable disease were encountered during the fiscal year ending June 30, 1922. During the summer of 1921, 20 vessels from Mexican ports were detained to complete 6 days from time of departure on account of the presence of yellow fever in those ports. No case developed among the personnel detained.

An arrangement has been made with the inspector in charge, United States Immigration Service, whereby an immigrant inspector is on duty at the quarantine station daily.

A breakwater has been built, which protects the boat basin from northeast winds and seas that formerly made entering and leaving the basin dangerous, especially during the winter months. About 1,100 tons of rock have been added to the rip-rap on the north and east sides of the station, filling in spaces created by storms and natural forces.

Hampton Roads (Va.) quarantine.—Post-office and telegraphic address of general office and boarding division, Fort Monroe, Va. Post-office address of hospital and detention station, Craney Island Division, Box No. 1428, Norfolk, Va.; telephone Holly 6502. Surg. H. F. Smith in charge.

During the past fiscal year 1,361 vessels were inspected and passed and 19 Government vessels were passed on the certificate of the ships' medical officer, making a total of 1,380 vessels.

Of the 1,380 vessels passing through the station, 1,093 were granted free pratique, while provisional pratique was granted to 287. Of the 287 vessels granted provisional pratique, inspectors were placed on board of 235 to enforce the requirements relating to same.

Fifty-two vessels were required to conduct their operations in the stream, owing to their being considered infected and because fumigation was impractical on account of their being cargo-ladened.

In connection with these vessels, inspections were made of 63,354 members of crews, and also inspection of 7,985 passengers, the total number of persons inspected at this station being 71,339.

Of the 1,380 vessels arriving, 559, or 40 per cent, were from foreign ports where quarantinable diseases prevailed.

A total of 503 vessels were fumigated, as follows:

Vessels requiring fumigation on account of conditions at previous ports of call.	315
Vessels fumigated under requirement governing periodic fumigation (par. 103, 1920 Quarantine Regulations).....	155
Vessels fumigated at request of other United States Government departments.	3
Vessels fumigated at request of agents.....	30

Total number of vessels fumigated..... 503

As the result of these fumigations, 5,709 rats were recovered. Three vessels were detained owing to presence on board of two suspicious cases resembling typhus fever, and one suspicious case resembling cholera. One vessel was detained on account of smallpox infection. The cases and other personnel were removed to Craney Island station and there detained until no longer considered a potential source of infection. In each instance all necessary measures were instituted on the vessel.

Sixty persons were vaccinated.

Transportation to and from vessels arriving at the station was furnished to United States customs officials during the year.

Upon instructions from the bureau, a vessel was selected from the fleet of Shipping Board vessels at Camp Eustice (the American Steamship *Hartford* (8,800 tons) for the purpose of conducting on same certain experiments in natural and artificial ventilation in connection with fumigation of vessels. This vessel, kindly lent to the service by the Shipping Board, has been placed on the quarantine anchorage at Fort Monroe, and at the close of the year the experiments are well under way and promise to add valuable data to our present knowledge of ship ventilation. Practical tests will also be made for new fumigants.

CRANEY ISLAND DIVISION (HOSPITAL AND DETENTION STATION).

The hospital and detention station at Craney Island has been used whenever necessary for the handling of personnel from infected vessels during the past year.

One additional building has been constructed at Craney Island during the year for use as a warehouse (for the storing of equipment not in immediate use) and portions of this building have been allotted for use as machine shop, carpenter shop, and paint shops. In addition to this, there has been constructed a laboratory for the examination of rats recovered after fumigation. This construction has just been completed and the assignment of a competent laboratory technician is contemplated.

Contract has been let for the driving of piling needed for the construction of a new marine railway with a capacity for handling any of the station vessels except the steam tug *Murray*.

The United States Shipping Board Emergency Fleet Corporation has completed the erection of 20 fuel-oil tanks, with a storage capacity of 1,000,000 barrels of fuel oil, on the area assigned to that agency under terms of a revocable license from the Secretary of the Treasury.

In accordance with permission granted by the Secretary of the Treasury, the city of Norfolk has completed the laying of a 36-inch water main across the southeastern portion of the island, the same being a portion of the new water supply furnished the city from Lake Prince, Va.

Floating equipment: The boarding tug *Murray* has been remodeled inside and out. A new boiler has been installed, the entire engine has been placed in excellent working condition, and the hull has been rebuilt in many places and entirely recoppered.

One new vessel, the *Heron*, was procured from the United States Navy and converted into a fumigating launch. The boarding launch *Widgeon* has been rebuilt in sections and the entire motor has been rebuilt. The launch *W. W. Miller* was transferred from this station to the Tampa Bay quarantine station, Fort de Soto, Fla. The entire floating equipment of this station is at present in excellent condition.

Hidalgo (Tex.) quarantine.—Acting Asst. Surg. W. P. Woodall in charge.

Service operations have been carried out in the same manner as in previous years, and directed chiefly against the introduction of typhus, yellow fever, and smallpox.

A total of 18,951 passengers passed through the port during the fiscal year, and 28 aliens were certified as diseased and disposed of by the immigration authorities. Two hundred and seventy-seven were vaccinated against smallpox.

Laredo (Tex.) quarantine.—Acting Asst. Surg. Nat K. King in charge.

The usual quarantine operations have been carried out at the port of Laredo. The total number of passengers passing through the station from the interior of Mexico during the year was 11,658; and of the local interurban traffic there were 1,026,146. The total number of persons passing through the station, subject to inspection but without further treatment, was 1,008,813. The number of persons disinfected was 4,035, and 31,375 were vaccinated, while 562 persons showing evidence of illness were refused admission.

There has been less tendency toward clandestine entries during the past year. The chief concern of this station was the exclusion of typhus fever and smallpox, and special measures were carried out to prevent the illegal crossing of the river by travelers above and below Laredo. Quarantine guards, using automobiles, engaged in the river patrol have in the past year apprehended 675 persons attempting illegal entry into the United States. After being diverted to the quarantine station, where they were disinfected and vaccinated, these persons were then turned over to the immigration authorities for further disposition. In a number of instances persons making illegal entry were apprehended by the quarantine guards, but, on account of the distance from the port of entry, they were merely vaccinated by the quarantine guards and released.

All freight cars entering the United States from Mexico were subjected to fumigation by cyanide gas; and while the procedure is carried out primarily for the destruction of insect pests, it also serves as a prevention against the introduction of plague by the destruction of rodents.

Mosquito control measures were initiated in the spring of 1921 under the supervision of Senior Sanitary Engineer J. A. Le Prince, of the Public Health Service, assisted by Sanitary Inspector J. M. Billingslea, and have been maintained by the local authorities, assisted by the Public Health Service. There has been a substantial reduction in artificial water containers, such as barrels, cisterns, etc., and a corresponding reduction in mosquito breeding.

Marcus Hook (Pa.) quarantine.—Surg. H. McG. Robertson in charge.

The work of the Marcus Hook quarantine station during the fiscal year 1922 was much reduced as compared with the preceding year. This was due in greater part to the general depression in the shipping business and, to a less extent, to the immigration act, which practically put an end to passenger business at the port of Philadelphia.

Only six vessels carrying passengers from European ports arrived during the year, all of them between July and November. There were 1,735 second cabin and steerage passengers inspected for vermin.

Only one vessel arrived during the fiscal year with a quarantinable disease aboard. This was the Danish steamship *Norden*, which came from Mexico, by way of Cuba, in August, 1921. One of the crew was found to have typhus fever, and the vessel was detained 14 days. No other cases developed.

As in the past, the greater portion of the vessels requiring fumigation arrive with cargo, making it necessary to do the fumigations in Philadelphia after unloading.

Mobile (Ala.) quarantine station.—Asst. Surg. E. B. Faget in charge. Post-office and telegraphic address, Fort Morgan, Ala.

During the fiscal year 473 vessels have been inspected. A total of 11,759 persons were inspected, including 11,619 seamen and 140 passengers. Of these, 335 seamen and 9 passengers were detained in quarantine from one to six days.

The medical inspection of arriving aliens during the year totaled 37 alien passengers and 6,188 alien seamen. Of these, 194 alien seamen were certified in accordance with the United States immigration laws.

New York quarantine.—Post-office and telegraphic address, United States quarantine station, Rosebank, N. Y. Surg. S. B. Grubbs in charge.

This report covers the first complete year of the operation of the New York quarantine station under the control of the United States Public Health Service, the transfer of the station from the State of New York having been made on March 1, 1921.

Boarding and inspection is done from the main station at Rosebank, on the west bank of the Narrows. Those sick or under suspicion are held at Hoffman Island or Swinburne Island, 3 and 4 miles, respectively, down the bay. Vessels entering via Long Island Sound are inspected at City Island, N. Y. Fumigation is done, for the most part, at the docks—an average distance of 8 miles from the Station and across one or more ferries. An office is maintained in the New York City Customhouse for the issuance of port sanitary statements, to give information, and to distribute fumigation certificates.

The work of the station is organized under three divisions: (1) Administration; (2) boarding, inspection, and detention; and (3) fumigation.

1. ADMINISTRATION.

This includes the administrative control of the other two divisions, supply of personnel equipment and supplies, repair and preservation of property, and expenditure of special appropriations.

Personnel: At the beginning of the fiscal year there were 3 commissioned officers, 13 acting assistant surgeons, 2 pharmacists, 1 scientific assistant, 1 consultant bacteriologist, 1 bacteriologist, 1 sanitary inspector, and 231 miscellaneous employees on duty.

At the close of the fiscal year there were 4 commissioned officers, 11 acting assistant surgeons, 2 pharmacists, 1 scientific assistant, 1 consultant bacteriologist, 1 sanitary inspector, and 188 miscellaneous employees, a reduction of 45 persons. There were 138 separations during the year.

Equipment and supplies: During the year the old equipment necessary for quarantine work has either been entirely replaced or extensively repaired. At the time of this report this may be considered to be in good working condition and to conform to the most modern methods, with a few exceptions. Some of the equipment, especially for fumigation and delousing operations, has been devised at the station and involves the application of new ideas or old ideas applied upon a more efficient and extensive basis.

Fumigating equipment: The station has eight trucks, three of which were acquired during the year. These trucks are used almost exclusively for fumigation purposes. With the exception of the G. M. C. light aviation trucks, of which there are three, the trucks are poorly adapted for fumigation. They are in a good state of repair in spite of very hard usage, as a complete garage and repair shop is being operated at the station. Aerothrusters require constant supervision.

Repair and preservation of property: When the station was taken over a large amount of repair and replacement to buildings, floating property, and machinery was necessary. This work has been carried on vigorously during the year, and much has been accomplished.

Several large items of repair have been made by the Supervising Architect's office, but all minor repairs, and many that may be considered extensive, have been performed by the station force.

New construction also has been done by the station force, including two large storerooms, an assembly room for immigrants, and a baggage delousing plant upon the wharf at Hoffman Island.

The station force also removed the old boilers to make way for the new heating plant.

New construction: The special appropriation of \$500,000, which was made by Congress for extraordinary repairs and improvements to the New York quarantine station, was expended through the office of the Supervising Architect, by contracts awarded prior to June 30, 1922. The chief items are as follows:

At Swinburne and Hoffman Islands:

Two new concrete dormitories with a capacity of 1,460 persons.

Small general hospital.

Kitchen, subsistence storeroom, bakery, ice plant, etc., in one building.

New heating plant, underground tunnels, and equipment.

A 6-inch pipe to bring water from the city main to Hoffman Island, a distance of 1 mile, together with cables for electric power and light.

Complete laundry equipment.

A garbage incinerator.

At Rosebank:

One building with four sets of officers' quarters.

Electric-lighting system.

Material for new garage.

Extension of Pier B.

Records: A complete count and record of all property has been made and brought up to date. A system of general files has been installed. Records of various transactions of the station are kept for the most part on 5 by 8 cards. By this system not only the daily transactions are recorded but the totals for the month are brought forward each day. In many cases the time consumed to perform the work in question is also recorded. The clerical force numbers one less than a year ago.

Floating property: Three boarding tugs, one side-wheel steamer, and five gasoline launches were received from the State of New York. All of these were in poor condition.

On the recommendation of a board of survey, aided by officers of the Coast Guard Service, the side-wheel steamer and one boarding tug were condemned as unfit for repair and have been sold. The remaining tugs have been repaired under the immediate supervision of the board. They are now in good running condition and no repairs have been necessary since March, 1922. A definite schedule of opera-

tion is in effect, and regular inspections are made by the board of vessels both in operation and under repair.

Two 40-foot launches were in very poor condition, but after a survey it was decided to have the engines rebuilt at the factory (Eastern Standard) and to repair the hulls, reducing the size of the cabin and moving it back in order to give a launch that would do for any quarantine work—boarding or fumigation. Both of these launches were completed and one has been transferred to Portland, Me., under its own power. The other three launches are in a more or less unsatisfactory condition, but plans have been made for their reconstruction.

The board also inspected several vessels available for transfer from other branches of the service, reporting favorably on the Army *L-37*, which was acquired. This launch had been on fire, but the hull is in good condition, and it is admirably adapted for quarantine purposes. She will be remodeled in accordance with plans drawn up by Surg. F. A. Carmelia, the work to be done by the station force. A new modified Diesel 100-horsepower engine has been purchased and will be installed.

Two small launches, after changes and repairs which are to be done by the station force, will be available for transfer to other stations.

2. BOARDING, INSPECTION, AND DETENTION.

The duties of this division consist of the inspection of passengers and crew from foreign ports, in order to detect quarantinable disease, to exclude vermin, and to enforce the proper disinfection and certification of certain articles of freight, to issue fumigation orders to those vessels requiring them under the regulations, and to instruct those on board as to the assistance they shall give in this process.

In addition, crews of freight vessels have been inspected as required under the immigration laws, in order to exclude loathsome, contagious, and chronic diseases. To assist in this immigration inspection, two medical officers are detailed from Ellis Island. A total of 462,521 passengers and 449,657 members of crews were inspected during the year. Of these passengers, 197,516 were third class.

The regular boarding personnel consists of one officer in charge of the division, five boarding officers, two officers assigned from Ellis Island, one bacteriologist, and two male and two female quarantine inspectors.

There are two steam tugs on boarding duty. During the morning one of these tugs is assigned exclusively to passenger vessels and the other to freight vessels. During the afternoon one tug covers both. Vessels are boarded regularly until the even half hour after sunset. In certain cases boarding has been done later when requested. It is believed that boarding should be extended considerably beyond the actual sunset hour in winter or that the sunset hour should be fixed at approximately the actual time of sunset in the summer months.

Throughout the year, vessels have been dispatched promptly without any sacrifice of thoroughness. This has been accomplished by boarding earlier than was formerly the rule, by having definite routine on shipboard, and by dividing up the boarding forces into two or more parties, when, as is frequently the case, several passenger vessels await inspection at the same time. Although the immigra-

tion examination of crews of freighters has been added, the number of officers now on boarding duty, including those from Ellis Island, is the same as last year, when many vessels, especially those carrying third-class passengers, suffered considerable delay.

Bathing, delousing, and detention: The facilities for bathing and for the delousing of baggage at Hoffman Island have been completed.

The new delousing plant begun by the State of New York in February, 1921, was completed about October 1 of that year. The emergency delousing plant that had been installed in February has been furnished with improved machinery. All five steam chambers have been equipped so that vacuum cyanide or steam may be used, and a complete baggage-sterilizing plant, also using vacuum cyanide, was put in operation in January.

The new assembly room on the wharf accommodates between 200 and 300 persons. The baggage-delousing plant consists of a chamber 4 by 5 by 32 feet, for the treatment of hand baggage by the vacuum cyanide method, which is controlled from the main delousing plant over 150 feet away. The steel chamber was made up from two old steam chambers. By this process 4,921 pieces of baggage were treated. The efficiency of the process has been demonstrated.

Practically all the employees at Hoffman Island have two distinct duties: One, the delousing and care of immigrants when they are present; the other, alteration, repair, and cleaning work when there are few or no detainees present. Thus, there is always a sufficiently large trained force on hand capable of delousing about 200 persons per hour. On account of the effective work in European ports, however, the capacity of this station has not been tested. During the year, 5,784 persons were detained and 4,030 deloused at Hoffman Island.

The most urgent repairs to dormitories, dining room, kitchen, and buildings have been made, but there remains much yet to do. The capacity of Hoffman Island has been limited by new construction in progress, but there were ready and available 1,100 beds at the end of the fiscal year in preparation of the opening of the immigration quotas.

Hospital: The following cases were treated in the hospital during the fiscal year:

Acne vulgaris.....	2	Smallpox.....	2
Acute gastritis.....	1	Surgical, Colle's fracture.....	1
Acute mania.....	1	Syphilis (secondary).....	1
Auto-intoxication.....	7	Typhoid fever.....	2
Erythemia.....	1	Typhus fever.....	2
Para typhoid fever.....	1	Vaccinia.....	2
Pneumonia (broncho).....	1	Varicella.....	4
Pus kidney.....	1		

The regular hospital has a capacity of 85 beds for adults and 6 for children, and the small hospital, when completed, will have a bed capacity of 40. At Swinburne Island the capacity of the hospital is 118 beds.

Considering the various quarantinable diseases, the following may be noted:

Typhus fever: An endeavor is made to exclude not only typhus fever but the carriers of this disease as well. This is accomplished

¹ One case female attendant from Ellis Island.

at New York on each European passenger vessel by an intensive examination of 100 of each sex selected by service inspectors from among the third-class passengers and at times from the second-class passengers. These passengers are stripped to the waist and minutely examined. Excluding the question of typhus, it is believed that such passengers should not have evidence of lice in any form to the extent of 4 per cent. If an infestation of 4 per cent or more is shown, the entire steerage is removed to Hoffman Island for delousing, and the vessel is allowed to proceed. By this arrangement the delay to passenger vessels carrying large numbers of steerage has been reduced to about one hour, whereas an intensive examination of everybody would require much more time and increased personnel.

The following case of typhus, a female cabin passenger, is of interest: The patient originally came from Russia, went to Warsaw, Poland, where she remained one month, and from there went to Antwerp, where she remained eight days. She was inspected and passed in this latter port. She then went on to London, where she remained five days. Later she passed through Southampton bound for the United States. Upon arrival at quarantine, New York, she was discovered and removed to Hoffman Island, together with 58 second-class and 57 third-class passengers for observation.

Cholera: No cases of cholera were discovered during the year. The Japanese steamship *Toso Maru* arrived at New York having had one death, possibly from cholera, at sea, and was detained for bacteriological examination of all persons on board.

Leprosy: Three suspected cases of leprosy were removed for examination by the laboratory, but were released when demonstrated to be negative.

Yellow fever: Yellow fever is relatively unimportant at this port on account of its geographical position, and no suspicious cases were encountered.

Plague: No cases of human plague have been reported.

Smallpox: One case of smallpox and several suspicious cases were found. As a result, 1,484 vaccinations were made. The small number of these cases indicates improved control, especially vaccination, at ports of departure and on ship board. It is believed that this has been encouraged by the New York quarantine station, where the methods regarding this disease have been changed, so that no detention of vessels is necessary and delay to passengers and crews is reduced to a minimum. This is done by standardizing vaccination, determining the immunity of the person vaccinated by the reaction that follows, and by releasing the person as soon as immunity is established.

Two examples may be cited: The Danish steamer *Lituania* from Russia stopped at Halifax en route for New York, with one case suspected to be smallpox. Both the Canadian quarantine officer and the United States consul at Halifax telegraphed this information to this station and requested advice as to the handling of the case and other people aboard the ship. They were advised to isolate the patient and to vaccinate all persons on board immediately following the sailing of the vessel for New York. This was done at sea, about 28 hours before arrival at New York. Examination of these vaccinations upon arrival showed that all but six gave a definite immune reaction and could consequently be released regardless of the diag-

nosis of the case. The entire delay to the vessel was less than three hours.

The British steamer *Princess May*, with a cargo of bananas, arrived at the port of New York with one case of smallpox in a member of the crew. All persons aboard were immediately vaccinated and removed to Hoffman Island. The vessel proceeded to the dock with a new crew within two hours after arrival. The persons vaccinated were observed and released, as immunity was demonstrated by vaccination reaction.

The need of standardization of vaccination was recognized early in the year, and now all vaccinations must be done by one of two methods. These two methods differ only in that one is done with a needle and the other with a dental chisel. Both require three abrasions, two of which are vaccinations and the other left for control.

Laboratory: For the purposes of organization, the laboratory is considered a part of the boarding division and assists in the diagnosis of sickness on incoming vessels, especially typhus fever by the Weil-Felix test. For this purpose a bacteriologist boards all vessels carrying third-class passengers from Europe.

All rats returned from fumigated vessels are necropsied, and since May composite injections of all rats from each vessel from plague-infected ports have been made. Instructions in the laboratory work in typhus fever, plague, and cholera have been given to all medical officers, with two exceptions, as well as several visiting officials.

3. FUMIGATION.

Fourteen hundred and eighty-three vessels were fumigated during the year. Of this number, 736 were fumigated throughout with HCN; 611 with HCN, omitting staterooms and similar living quarters; 68 with sulphur and HCN; 10 with sulphur throughout; and 58 were done by ship's personnel under the station's supervision.

The present fumigation force consists of 1 medical officer in charge, 2 clerks, and 4 medical officers in the field. There are five fumigating crews. Four of these using trucks for transportation, consist each of a foreman, four fumigators, and a chauffeur; and one, using the tug *Von Ezdorf*, has, in addition to the regular tug's crew of five, two extra deckhands and a cook.

The fumigating crews receive their supplies and apparatus at Rosebank each morning, proceed to the ships they are to fumigate, and return to the station the same day. There are unusual difficulties encountered in fumigating at New York on account of the great size of the harbor and the extreme distances that must be covered. The records show that an average of 16 miles must be covered in the fumigation of each ship, and in certain instances this runs as high as 30 miles, including the crossing of one or more ferries.

The number of persons engaged in fumigation work is about double that previously employed, but this is necessary under the peculiar conditions that exist and the extreme care that must be taken to avoid loss of life. Practically all ships are fumigated with hydrocyanic acid gas. Under certain circumstances, especially when the vessel must sail at once, sulphur dioxide is used.

Among the safety rules enforced, it is required that the medical officer and his crew stand by a ship until it is entirely free from gas and has been declared safe. This rule, as well as the great distances,

prevents more than one ship being done at a time. It is considered that two ships a day is all that one crew can do under these circumstances, the regular hours for beginning being 9 a. m. and 12 noon. Working on this schedule, it is seldom possible to begin a second ship on time. It is theoretically possible to fumigate a ship with cyanide gas in four hours; practically this can not be done. If five hours are allowed, and one hour to go and one hour to return, the fumigating day for two ships is twelve hours.

With the exception of the apparent inefficiency of the plan by which this station operates over such large territory from headquarters located so far from the center of business, the fumigation system is now operating satisfactorily.

In order to minimize the danger to life, a close supervision is made both personally and by reports. Since the reorganization of the work in the middle of last July, there have been no accidents, but at least two instances have occurred that might have been serious, in spite of the enforcement of safety regulations. Constant vigilance should make accidents rare, but can not entirely eliminate them.

Although the previous custom at New York was to fumigate only holds, forecastles, and storerooms, fumigation throughout was begun to conform to the quarantine regulations, exception being made only to places that inspection showed to be free from rats and rat harborage.

Unfortunately, the fees for charges in force under State administration, and continued by act of Congress, were exceedingly high for practically all parts of the superstructure, and bills for complete fumigation were so excessive that in January the bureau ordered the discontinuance of complete fumigation. Since that time the engine room, fireroom, staterooms, cabins, steerage accommodations, officers' quarters, and similar superstructure have not been fumigated except for special reasons.

Examination of rats: Only rats that are actually returned to the station are credited and entered upon the fumigation certificate. The necessity of proceeding promptly to the next ship, or the late hour when the second ship is finished, militates against a careful search; but as a rule all rats in the open, at least, are returned. There is seldom time to shift dunnage and similar material. When this can be done, a larger number is usually found. All rats are tagged and examined at the station laboratory if their condition permits. During the year 6,925 rats were collected.

Experimental: Many experiments have been made to determine the most practical time of exposure and to measure the penetrating qualities of hydrocyanic acid and sulphur dioxide gases. Experiments have also been made with the object of shortening the time necessary for sulphur fumigation by devising methods to accelerate sulphur burning.

A large cyanide generator for fumigating holds has been installed on the tug *Von Ezdorf*. The features of this generator are that the gas is forced in by its own pressure through a 1-inch garden hose.

The question of compressed air for airing out ships has been investigated. Figures from the engineers of the Ingersoll Rand Co. show that the compressed air apparatus can be of service, but it is too bulky for rapid transportation and too expensive for use here. A practical demonstration was made on the steamship *Southern Cross*, fumigated at a shipyard where compressed air was available. The

aerotherm operating alongside the compressed air apparatus gave considerably better results.

One demonstration has been made of liquid cyanide by a commercial firm, and this method will be tested further. There is an economy of labor over present methods. It is efficient, but is probably more dangerous.

Gas masks: Methods of using gas masks have been constantly studied. Two special designs of mouth-breathing apparatuses have been made following suggestions and experiments at this station. They are small and can be carried in a coat pocket. The old style Army mask, with face piece removed, also is practical. The new style Army mask (nose breathing) and many commercial masks are entirely unsuited.

Fumigators are required to be familiar with gas masks and must carry them when testing out holds. They are encouraged to use them when entering superstructures to open up and at other times.

General: All officers on duty at this station have been given regular training in all branches of the station's work, including laboratory work as applied to quarantine. This has been done regardless of the previous experience of the individual officer, in order to standardize operations and to allow flexibility.

During the year an advisory laboratory board of five members was created. This board meets the first Tuesday of every month. One of the members, Dr. William H. Parks, is the director of the research laboratory of the department of health of New York City, and also consultant bacteriologist of this station. The purpose of this board is to advise the chief of the laboratory, to make plans for new work, and to review what has been done.

Besides the service officers detailed to this station for instruction, a great many persons interested in quarantine and public-health work visited the station. On November 8, 1921, 40 members of the Public Health Institute were given a demonstration of inspection, delousing, and quarantine laboratory methods.

Financial: The pay roll for the station for the fiscal year amounted to \$230,502.83. There was a decrease of nearly \$2,000 a month between the pay rolls of the first and last months of the year. Other expenditures amounted to \$170,331.82, making a grand total of \$400,834.65.

Bills issued for services rendered during the year amounted to \$352,129.18.

Pensacola (Fla.) quarantine.—Post-office and telegraphic address, Pensacola, Fla. Surg. (R.) S. R. Mallory Kennedy in charge.

During the current fiscal year there were inspected at this station 401 vessels, 2,090 crew on vessels arriving from foreign ports, of which 1,238 were alien seamen, and no passengers.

Of the vessels inspected during the past year, 112 arrived from foreign ports and 289 were of coastwise status.

There were 133 vessels fumigated, 57 foreign and 76 coastwise. Of the 57 vessels arriving from foreign ports 50 were fumigated for rodent plague at the port of departure, 6 for human plague, and 1 for yellow fever on board.

Of the 76 coastwise vessels fumigated 32 were fumigated for rodent plague at the port of departure, 34 at the request of owners, and 10 six-month fumigations.

There were recovered by the fumigating squad 333 rats and 40 mice. The greatest number found immediately after fumigating by the service employees was 36 rats and 7 mice in the holds of the Greek steamship *Oossifoglu*. These rodents were examined for plague with negative results.

On October 6, 1921, the barge *J. S. McGaughey* arrived from Tampico, Mexico, with a typical case of yellow fever on board in the person of the captain. The vessel had lain alongside a wharf at Tampico for 30 days prior to departure, and the captain and crew spent most of the time ashore. The vessel left Tampico on September 30 after cyanide fumigation by a representative of the United States Public Health Service. On the morning of October 1 the captain had a severe chill and headache, epigastric pain, also pain in back and limbs; bowels constipated, slight nausea present. When the patient arrived at quarantine the tongue was coated, eyes were injected, marked jaundice present, temperature 40° C., pulse 96. Patient stated that he had never had malaria or typhoid, nor had been vaccinated against typhoid. Three specimens of blood examined were found negative for malaria and typhoid. The urine contained a quantity of albumin.

The barge having dropped anchor 2 miles from the city in the middle of the bay, was left in that position, and, upon completion of fumigation, was turned over to the owners. The patient and the remainder of the crew were at once removed to the quarantine station, where the patient was isolated in a screened hospital ward. The rest of the crew were held in screened wards for observation for a period of seven days from the date of their removal to the station. No new cases developed, and at the end of the detention period the crew were allowed to proceed to the city. The patient was discharged, after a severe illness, on October 22.

The bill of health issued this vessel indicated that the last case of yellow fever reported in Tampico occurred on July 14, 1921.

This makes the second case of yellow fever detected here on vessels arriving during the past two years. In both instances the cases came from Mexico, and in both instances the vessels were thoroughly fumigated prior to departure.

It is believed that the thorough fumigations performed by the service on these two occasions at the port of departure killed all *Aedes calopus* and prevented the other members of the crew from contracting the disease.

On account of the great danger to human life, every precaution possible has been taken during the past year to prevent accidents incident to the cyanide method of fumigation, which is practiced at this station exclusively. Every hold and every compartment on each vessel fumigated has been personally inspected by the medical officer in charge before the ship was turned over to the crew, and it is a pleasure to report that no accidents have occurred.

Vessels have been boarded practically when they dropped anchor, and when not detained by the agents and crew have been given quick dispatch when it was found necessary to fumigate.

Two hundred and sixty-three port sanitary statements have been issued; of this number 14 were foul.

Port Angeles (Wash.) quarantine.—Acting Asst. Surg. Frederick T. Hyde in charge. Post-office and telegraphic address, Port Angeles, Wash.

Twenty-one vessels were inspected and passed: 2 were steamships and 19 were sailing vessels. Three vessels were fumigated.

These vessels carried a total of 372 seamen and no passengers.

In addition to this, the American steamship *Sol Duc* was inspected twice a month for aliens.

Portland (Me.) quarantine.—Acting Asst. Surg. Albert F. Stuart in charge. Post-office and telegraphic address, Portland, Me.

During the fiscal year 124 steamers and sailing vessels were inspected and passed. These vessels carried 2,387 passengers and 6,608 members of crews. Two United States transports carrying returned United States troops from Germany were passed on the certificate of the medical officers. Thirty-three steamers from cholera and plague-infected ports were disinfected throughout for the destruction of rats and other vermin. Two hundred and seventy-eight dead rats were collected from these vessels and examined for evidence of plague infection. None were infected.

No quarantinable diseases were encountered during the year. Owing to the restrictions placed on immigration by the United States and also by the Dominion of Canada, there has been a smaller number of arriving aliens than usual.

Since the receipt of instructions to fumigate vessels, even if from clean ports, once in six months, the number of fumigations has greatly increased.

Port Townsend (Wash.) quarantine.—Surg. Joseph Bolten in charge. Post-office and telegraphic address, Port Townsend, Wash.

During the current fiscal year this station was concerned in the handling of the quarantinable diseases, cholera and leprosy, as follows: On January 20, 1922, the Japanese S. S. *Aden Maru* arrived from Miike, Japan, with the history of a suspicious death on board. The vessel and crew were sent to the station, and cultures were made to ascertain if cholera cases were present. The cultures were all negative and the crew and vessel were released. The leper patient, who has been under care and treatment at this station for 11 years, was turned over to the marine hospital for transfer to the Public Health Service leprosarium at Carville, La.

Two hundred and eighty-three vessels were inspected—256 steamships and 27 sailing vessels. Sixty vessels were fumigated, 33 were inspected and passed, 1 was boarded and passed, and 198 were remanded to other ports. Nine additional vessels were fumigated upon the request of medical officers of other ports.

These vessels carried a total of 21,411 seamen and 5,980 passengers. The quarantine officers assisted in the medical examination of aliens arriving aboard these vessels.

Arrangements were made in December for the boarding of passenger vessels at Victoria, British Columbia, to carry out quarantine procedure en route to Port Townsend, thereby enabling the vessels to save from 2 to 14 hours.

The wharf was repaired in July and August, and a bridge was built over the approach. An electric light plant was installed, a passenger shed was built on the wharf, and a new disinfecting chamber and donkey boiler were received during the year.

Providence (R. I.) quarantine.—Surg. W. A. Korn in charge. Post-office and telegraphic address, 403 Federal Building, Providence, R. I.

During the fiscal year 134 vessels were boarded for quarantine inspection, as follows: 111 steamers, 9 barges, 12 schooners, 1 barken-

tine, and 1 motor yacht. These vessels carried 6,187 crew and 3,340 passengers, also 3 stowaways.

No quarantinable disease was found among the crew or passengers. Of communicable diseases not quarantinable, one case of chicken pox and two cases of mumps were detected and reported to the local health authorities.

No vessels were fumigated at this station during the year.

Reedy Island (Del.) quarantine.—Administrative Asst. Charles N. McMunn in charge, under supervision of Surg. H. McG. Robertson, in charge of quarantine system on Delaware Bay and River. Post-office address, Reedy Island, Del.

This station has been held in reserve to care for passengers and crews of vessels that might be remanded thereto from the boarding station at Marcus Hook, Pa. There have been no transactions of a quarantine nature during the year.

Sabine (Tex.) quarantine.—Acting Asst. Surg. P. H. Chilton in charge. Post-office and telegraphic address, Sabine, Tex.

The Sabine (Tex.) quarantine station has operated, under terms of lease between the State and Federal Governments, as a national quarantine station since September 1, 1919.

The equipment consists of two gasoline launches, the *Willie Hobby* and the *Everitt Sherrill*, both of which are in good condition; the launch *Sherrill*, which had been in storage at Beaumont, was returned to the station on April 29, 1922.

During the fiscal year 1922, 918 vessels, with crew and passengers aggregating 29,427, were inspected: 298 of these ships were fumigated with hydrocyanic acid gas.

Medical inspection of alien seamen and passengers for immigration purposes was continued, and during the fiscal year 17,196 alien seamen and passengers were inspected. Of these, 79 were certified.

No quarantinable diseases were noted among the passengers or crew of vessels during the year.

St. Johns River (Fla.) quarantine.—Acting Asst. Surg. F. R. Maura in charge. Post-office and telegraphic address, Mayport, Fla.

During the current fiscal year 1922, 83 steam and 47 sailing vessels, with a total in crews of 3,154 and 15 passengers, were inspected. No quarantinable diseases were found and no vessels detained except for fumigation.

There were 26 vessels fumigated, and 250 rats were found. It was found at this station that sailing vessels were worse rat-infested than steam vessels.

San Francisco (Calif.) quarantine.—Surg. F. French Simpson in charge. Post-office and telegraphic address, Angel Island, Calif.

During the current fiscal year 605 vessels have been inspected and passed, containing a personnel as follows: Crew, 41,399; passengers, 37,761; total, 79,180.

The vessels inspected have been, as a rule, unusually free from illness of any character en route, and on arrival have been free from quarantinable disease or previous contact requiring detention for observation.

In addition to the performance of routine quarantine duties, quarantine boarding officers have assisted aboard vessels in the medical examinations of all arriving aliens. Alien passengers to the number of 13,543 and 33,878 alien members of crew, a total of 47,421,

have been inspected, of which number 542 alien passengers and 79 alien seamen were subsequently certified. This cooperative work, however, consists only in the certification of alien passengers or crew when an immediate diagnosis aboard ship can be made, or the detention of alien passengers or crew for subsequent medical observation when the presence of deportable disease can not be immediately confirmed. The subsequent care, examination, and disposition of the cases is under the direction of the Public Health Service officer in charge of the immigrant hospital, under the direction of immigration authorities. A detailed report of the cases herein enumerated is therefore made through his office.

Fumigation: The possibility of the introduction of bubonic plague by rodents has been kept constantly in mind, and all vessels entering this port have had their records carefully examined, and all ports of call during the previous six months were fully considered. No vessel has been found plague infected, and only one vessel arrived with evidence of this possibility. This vessel, the Japanese *S. S. Tenyo Maru*, arrived in quarantine from Yokohama direct on July 27, 1921, with the following history:

There embarked at Hongkong, on June 21, a first-class Japanese passenger. On June 26 this passenger became suddenly ill and died on June 28, between Nagasaki and Kobe. At Kobe a presumptive diagnosis of bubonic plague was confirmed. The body was cremated, the vessel fumigated, the cabin occupied and all cabins adjacent thereto were torn out, and on July 4 guinea pigs were introduced in this area. On July 9 a guinea pig so exposed died of positive plague. The holds were then fumigated with carbon monoxide and the infected cabin area fumigated with sulphur dioxide. Twelve rats were recovered and were found negative for plague. The personnel was quarantined at Kobe for 12 days, following which the vessel proceeded to San Francisco via Yokohama.

After an examination of all the facts, it was the conclusion that the case was a result of exposure to infected fleas obtained from infected rats aboard the vessel, and while intelligent and thorough fumigation methods preceded the arrival of the vessel at San Francisco, it was deemed wisest to refumigate. This was done with hydrocyanic acid gas throughout, both before and after discharge of cargo. After a thorough and painstaking fumigation, only three rats were found, which, upon examination at the Federal laboratory, proved negative for plague.

Under the usual routine it has been found practicable to allow cargo-laden vessels to discharge prior to fumigation. Vessels in ballast, however, have been required to fumigate upon arrival. During the fiscal year, in accordance with this practice, 578 vessels have been fumigated for the destruction of rats: 475 with hydrocyanic gas, 95 with sulphur dioxide gas, and 8 with both hydrocyanic and sulphur dioxide gases. This fumigation work required the use of 53,879 pounds of sodium cyanide, 145,566 pints of sulphuric acid, and 90,765 pounds of sulphur. As a result, there were obtained 2,896 rats as follows:

<i>Mus rattus</i>	1,766
<i>Mus alexandrinus</i>	1,084
<i>Mus norvegicus</i>	6
Unidentified.....	40
Total.....	2,896

In addition, 1,360 mice were obtained.

Two thousand one hundred and seventy-six of the rats were forwarded to the laboratory for examination; no plague infection was found.

Location of rats found after fumigation: In the previous annual report there was transmitted a record showing the location where rats were found dead after fumigation with cyanide, and from the evidence obtained it seemed correct to hold that (1) one-half of a ship's rats will be found outside the ship's holds; (2) one-half of the rats outside the holds will be found in compartments comprising forepeak, steerage deck, chain lockers, and staterooms.

This record has been continued, and a statistical report covering the period July 1 to December 31, 1921, inclusive, indicates that during this period 281 vessels have been fumigated with hydrocyanic gas, from which there were obtained a total of 1,855 rats, of which 1,155 were *alexandrinus* and 700 were *rattus*. No Norway rats were found. Of this total of 1,855 rats, 803 were found in holds and 1,052 were found in compartments of the vessel other than holds. This supplemental report bears out the former statement and would further indicate the necessity for the fumigation of a vessel throughout (except engine room and fireroom), in order to insure, for practical purposes, that all rats have been destroyed.

Among the nationalities represented by these vessels, only American, British, and Japanese vessels were fumigated in sufficient number to warrant a comparative estimate of rats found in vessels under the different flags. Comparing the number of rats prevalent on vessels, according to nationalities, the following degrees of infestation were found:

Among 664 vessels of the above nationalities, 47 per cent (less than half) of the American vessels were found rat infested, whereas 62 per cent of the British vessels and 70 per cent of the Japanese contained rats. It would seem certain, therefore, that as a general rule fewer American steamships contain rats than vessels of any other nationality. The average number of rats per vessel, compiled from this series of vessels fumigated, is as follows:

Nationality.	Rats per vessel.
American.....	4.3
British.....	7.6
Japanese.....	11.1

In this connection it is of interest to report that among 783 vessels of varying nationalities fumigated, no rats were found after fumigation in 345 vessels. This freedom from rats is believed to be due to modern construction, advancement in sanitary education, and periodic fumigation of vessels.

Service direction of cyanide fumigation work: From the inauguration of fumigation work in 1915 to the fall of 1921 the labor and chemicals required in cyanide work have been furnished directly by the steamships or the agency concerned, the service providing supervision alone. On September 1 the bureau modified this policy and directed that service representatives in this port take over and carry out all work connected with the process, furnishing, in addition to supervision, all labor, chemicals, and transportation. A substation was established on Meigg's wharf, San Francisco, as fumigation headquarters, chemicals were purchased and stored, a truck was obtained and assigned, and an experienced personnel was provided.

This has resulted in the more efficient and economical application of cyanide fumigation work, reducing materially the cost of the process to the vessel concerned.

Unfortunately, in February, 1922, two fatalities occurred on board the British S. S. *Tahiti* after inspection and release, following fumigation. The occurrence of these deaths, notwithstanding the application of measures of safety which had been previously successfully employed, made evident the need for additional safeguards to life, and, as a result, all fumigation of the holds of vessels with cyanide gas was temporarily discontinued.

Foreign extension of plague infection: During the current fiscal year an epidemic of bubonic plague occurred in Sydney, Australia. The disease has also been reported in adjacent seaports. Notwithstanding the activity and intelligent methods of prevention instituted in Australia, it has been deemed best to employ additional measures of safety on vessels arriving from these ports. With this in view, fumigation of the superstructures with cyanide, immediately after arrival, and the subsequent fumigation of the entire vessel, both holds and superstructures, immediately after discharge of cargo, has been the routine practice.

Anthrax: As provided in the revised quarantine regulations, a special effort to intercept and prevent the introduction of anthrax has been made in so far as it relates to shaving brushes. Cargo manifests are carefully scrutinized, and where articles manufactured of bristles are noted, the character of the articles is fully determined before release. Shaving brushes not properly certified in accordance with regulations are sterilized or returned to the consignee.

Other station activities: Semi-weekly fumigations of infected clothing, received from the hospital at Fort McDowell, have been carried out during the fiscal year.

Launch contracts: During the year there was forwarded to the Columbia River quarantine station, Astoria, Oreg., the launch *Donald Currie*, a 60-foot, 65-horsepower gasoline launch, of a type adapted to the routine boarding duties at the average quarantine station.

During June of the present year, contract was let for the construction of a third launch at San Francisco, of the *Donald Currie* type, with certain modifications of interior, which, on completion, will be transferred to the United States quarantine station at Honolulu.

Tampa Bay (Fla.) quarantine.—Acting Asst. Surg. M. D. Hollis in charge. Post-office address, Fort de Soto, Fla. Telegraphic address, Fort Dade, Fla.

This station is ideally located for quarantine purposes, on Mullet Key, 34 miles from Tampa, Fla., and accessible only by boat.

During the current fiscal year, 298 vessels were inspected, of which 55 were fumigated. No quarantinable diseases were found. Total number of crews inspected 6,163; passengers, 72.

On October 25, 1921, a severe storm totally destroyed both the station launches and resulted in much minor damage to the buildings. The station force has since been busy repairing and repainting same. The launches have been replaced with the *W. W. Miller*, which has sufficient capacity and power to transport supplies and subsistence from Tampa.

TRANSACTIONS AT FOREIGN AND INSULAR QUARANTINE STATIONS FOR THE FISCAL YEAR ENDED JUNE 30, 1922.

The following table summarizes the transactions at the foreign and insular quarantine stations for the fiscal year:

Summary of transactions at foreign and insular stations for fiscal year ended June 30, 1922.

Stations.	Total number of vessels inspected.	Number of vessels fumigated.	Total number of passengers and crew inspected.
Aguadilla, P. R.	12	0	127
Ahukini, Hawaii	2	0	43
Amoy, China	59		
Antwerp, Belgium	45	9	27,617
Arecibo, P. R.	10	0	185
Athens, Greece	63	14	2,929
Barcelona, Spain	145	112	248
Bergen, Norway	9		689
Bremen, Germany	25	10	19,843
Callao, Peru	220	38	36,464
Cavite, P. I.	44	0	5,729
Cebu, P. I.	75	0	5,837
Central Aguirre and Arroyo, P. R.	8	0	186
Cherbourg, France	184		19,306
Christiania, Norway	46		10,419
Christiansted, Virgin Islands	5	0	77
Constantinople, Turkey	55		2,260
Copenhagen, Denmark	30	6	8,944
Danzig, Europe	65		13,267
Fajardo, P. R.	79	0	382
Frederiksted, Virgin Islands	28	0	3,639
Genoa, Italy	100	65	4,165
Goteborg, Sweden	14	3	11,283
Guanica, P. R.	88	5	4,063
Guayaquil, Ecuador	202	50	15,050
Habana, Cuba	1,687	173	166,477
Hamburg, Germany	256	148	242,449
Havre, France	82	20	20,558
Hilo, Hawaii	38	10	2,398
Hongkong, China	491	674	77,542
Honolulu, Hawaii	567	35	159,326
Humacao, P. R.	14	0	114
Iloilo, P. I.	47	251	495
Jolo, P. I.	39	0	3,352
Kahului, Hawaii	8	1	231
Koloa, Hawaii	10	0	209
Lahaina, Hawaii	3	0	119
Libau, Latvia	27		2,663
Liverpool, England	147	41	41,250
London, England	12	6	1,985
Mahukona, Hawaii	0	0	0
Manila, P. I.	775	181	129,043
Mayaguez, P. R.	82	4	4,057
Messina, Italy	69	4	53
Naples, Italy	192	36	46,321
Olongapo, P. I.	2	0	195
Palermo, Italy	138	12	3,438
Patras, Greece	37		1,846
Ponce, P. R.	104	9	4,039
Port Lobos, Mexico	302	0	
Progreso, Mexico	214	46	12,811
Puerto Mexico, Mexico	45	17	
Rotterdam, Netherlands	95	33	16,130
St. Thomas, Virgin Islands	455	5	18,188
San Juan, P. R.	362	287	25,688
Shanghai, China	475	6	
Southampton, England	103	7	26,553
Stavanger, Norway	10		704
Tampico, Mexico	1,352	177	
Trieste, Italy	36	31	3,780
Tuxpam, Mexico	87	0	
Vera Cruz, Mexico	322	322	13,869
Zamboanga, P. I.	24	0	2,845
Total	10,322	2,878	1,011,280

¹ Transactions since Feb. 1, 1922.

² Includes inspections at Bremen from July 1, 1921, through Jan. 31, 1922.

CALLAO, PERU.

Acting Asst. Surg. J. L. Castro-Gutierrez in charge.

During the year 200 vessels destined for ports of the United States were inspected, of which number 38 were fumigated for the destruction of rodents; 19,001 members of crews and 17,463 passengers were inspected; and 3,167 persons were vaccinated as coming from localities infected with smallpox.

Data are not available to the Public Health Service office in Peru as to the number of cases of plague occurring during the calendar year 1921. Two hundred and ninety-eight deaths occurred during that period, and it is estimated that there was a total of approximately 600 cases. The lack of available funds has seriously limited the Department of Sanitation of Peru in combating the spread of plague or effecting other sanitary reforms, and very little has been accomplished in the control of plague. No case of yellow fever has been reported since July, 1921. While there is in effect a compulsory vaccination law, an epidemic of smallpox occurred in Lima during the first six months of the calendar year 1922. The infection was apparently introduced from the mountain districts.

SERVICE OPERATIONS IN EUROPE.

Assistant Surg. Gen. Rupert Blue, in general charge (Paris office), reports as follows.

The Paris office has served as the central coordinating agency for service work in Europe. It is concerned with the transmission of bureau orders, the issuance of supplemental instructions, the collection of sanitary information, and supervision of the observance of the United States quarantine regulations as enforced at foreign ports. Inspection has been maintained at 27 ports of embarkation under the direction of 25 medical officers, assisted by physicians and lay personnel of the transportation companies.

In all countries, excepting Italy, the work of disinfection, disinfestation, and vaccination was performed by steamship employees, utilizing facilities provided by the respective companies. At Italian ports, however, the Government owns and operates the disinfecting plants and the emigrant barracks, and the work is carried out by employees of the Department of Emigration.

It has been the aim of the central office to secure, with as little delay as possible, the provision of adequate facilities at the ports of embarkation for the efficient performance of the work devolving upon the steamship companies. This task has been difficult because in some instances, owing to the scarcity of available buildings and the high cost of labor and materials, the companies have been unable to acquire or to build hotels and barracks for the exclusive use of emigrants destined for ports of the United States. This difficulty has been overcome at Cherbourg, Le Havre, and Southampton, by the provision of adequate buildings and the installation therein of baths and the necessary equipment. Constantinople, Patras, and Piræus are still backward in this respect, but it is believed that the companies concerned will be able to arrange for the sanitary housing of their clientele during the coming year.

AMENDMENTS TO THE 1921 REGULATIONS.

The following amendments to the 1921 regulations became effective May 25, 1922:

INSPECTION, DELOUSING, DETENTION.

Paragraph II. (a) Second-cabin passengers originating in countries east and south of Germany, Switzerland, and Italy, excepting Poland, Russia, and Turkey, shall be inspected, and if found to be free from lice and eggs of the same, shall be allowed to embark without application of further measures.

(b) All persons of this class found to be verminous shall be deloused, detained, and have their effects disinfected as in the case of steerage passengers coming from the same countries.

(c) Second-cabin passengers originating in Poland, Russia, and Turkey shall be deloused and placed under observation in clean quarters for a period sufficient to complete 14 days from the date of disinfection to the day of arrival at a United States port.

(d) Second-cabin passengers originating in countries west of the easterly boundaries of Germany, Switzerland, and Italy, including Great Britain, Denmark, Norway, Sweden, and Finland, shall not be subjected to inspection unless good reasons exist for its application.

The second-cabin baggage was exempted from disinfection, unless subject thereto under the provisions of Paragraph II.

The restrictions in force during the fiscal year 1921 were maintained, with the exception of those relating to the inspection and vaccination of second-cabin passengers originating in central and western Europe. It was deemed advisable, in view of the decline in the incidence of smallpox and typhus fever in these countries, to discontinue the inspection of second-cabin passengers coming from western Europe, unless good reasons exist for its application. The phrase "unless good reasons exist for its application," appearing in Paragraph II (b) of the amended instructions, approved May 22, 1922, is intended to cover the following classes: (1) Persons of the emigrant type (steerage) allowed in the second cabin; (2) passengers known to have been exposed to infection; and (3) persons having come in contact with the classes subject to delousing prior to their disinfection.

Because of the fact that passengers of the emigrant type are often found in the second cabin, it was deemed necessary to make these exceptions in order to protect the better class of tourists against vermin and possible typhus infection. This measure has been amply justified by the results and should be continued. It will be noted that the amendments above referred to do not exclude from inspection and disinfection persons originating in Poland, Russia, and Turkey, in which countries epidemic diseases prevail to an alarming extent.

EMIGRATION.

Although the volume of emigration permitted under the provisions of the immigration act of June 3, 1921, is not sufficient to cause overcrowding of vessels or a congestion of passengers at the ports of embarkation, if properly managed, there was a tendency on the part of the companies to rush and to overcrowd the traffic during certain seasons of the year. Emigration from Germany and Ireland was resumed during the year. From data furnished by the White Star and Cunard Lines it is noted that 1,315 second-cabin and 2,932 steerage passengers embarked at Queenstown for the United States.

There are no data available as to the number transported by the United States lines, but it is presumed that it is about equal to the figures above mentioned.

In view of the absence of quarantinable disease in epidemic form and of the disturbed political situation in Ireland, it did not seem advisable to recommend the assignment of a medical officer to Queens-town. The companies operating there, however, were notified, through the American consulate, that delousing and vaccination were required of all steerage passengers prior to embarkation and that provision should be made for the prompt enforcement of the regulation. A similar communication was addressed to the North Atlantic Passenger Conference, through the medical officer attached to the consulate at Liverpool. This officer also visited Queenstown for the purpose of advising the consul and the steamship agents concerning the application of adequate measures through the use of available facilities.

DUTIES OF MEDICAL OFFICERS.

In addition to quarantine work, medical officers at the various ports, in accordance with bureau instructions of March 17, 1922, examine and prescribe for American seamen upon the request of the consuls. Medical examination of aliens applying for visés may also be made with a view to advising the consul as to whether the applicant will be admitted under the immigration laws at American ports.

Cooperation was established and maintained during the year with the Canadian medical authorities stationed in Europe. By arrangement with the bureau, the Canadian Department of Health adopted similar quarantine procedures with regard to emigrants destined for Canada via United States ports and emigrants bound to America via Canadian ports. Medical officers of the Public Health Service were instructed to assist in carrying out these measures at all ports of embarkation.

DERATIZATION OF VESSELS.

Fumigation of vessels to destroy rats continues to occupy much of the attention of the medical officers at the larger ports, and a large number of fumigations were certified as complying with the United States quarantine regulations. Hamburg, among the northern continental ports, absorbs a very large share of the work. Ship brokers at Rotterdam and other ports usually have fumigations done at Hamburg, for economic reasons, when possible. Cyanide gas has been introduced as a fumigant at Liverpool, and bids fair to gain in popularity as its advantages over the slower and more expensive processes become known. It is employed almost exclusively for this class of sanitary work in Italy.

PREVALENCE OF QUARANTINABLE DISEASE.

The endemic prevalence of the four diseases—cholera, plague, small-pox, and typhus fever—was carefully followed, and the information collected concerning new developments was forwarded by cable or letter to the bureau and to the European stations. Prompt transmission of data of this character lessens the risk of the importation of quarantinable disease to a considerable extent.

Cholera.—Cholera remained confined to Russia until the month of June, 1922, when cases began to appear in central and southern Europe. A vessel—the steamship *Cavoundes*—transporting refugees from Novorossisk, Russia, arrived at Saloniki, Greece, on June 17, with cholera on board—30 cases, with 11 deaths, occurring after the passengers were landed at quarantine on St. Georges Island. This vessel was reported May 31 at Kavak, a quarantine station on the Bosphorus, at which time two cases had been observed. A fatal case was reported in Athens June 24.

The Polish Ministry of Health notified the Office International d'Hygiene Publique, under date of June 27, that during the week ended June 10, 1922, there had occurred five cases of cholera, with two deaths, among repatriates at Rowno, Poland.

So far as is known, the Baltic States, Bulgaria, Rumania, and Turkey in Europe remained free from the disease up to the end of the fiscal year. Cholera conditions in the Ukraine continue to cause great anxiety among the sanitary authorities of the adjacent countries, and a strict quarantine is maintained by them against arrivals from Russia.

Typhus fever.—The situation in central and western Europe with regard to typhus fever has undergone considerable improvement during the past year. Cases of the disease, however, have been reported in Austria, Czechoslovakia, Finland, Germany, Hungary, Greece, Italy, Latvia, Portugal, and Spain, and a sharp outbreak occurred among laborers at Birkenhead, England—13 cases, with 3 deaths, having been reported from April 6 to April 20, 1922.

The greatest prevalence of typhus in Poland since the winter of 1921 occurred in February and March of 1922; in the last week of February 2,057 cases were reported. The reason for this increase, so it is stated, is the repatriation of Poles from Russia under the stipulations of the treaty of Riga. From consular reports it is ascertained that in the district of Nowogrodek there were reported during the period March 26 to April 22, 5,695 cases of typhus fever, with 349 deaths. For the district of Stanislawow, during the same period, there occurred 468 cases of smallpox, with 113 deaths. In the city of Warsaw 225 typhus cases were recorded from February 26 to April 22.

Smallpox.—Cases of smallpox were reported in Belgium, Czechoslovakia, England, France, Italy, Latvia, Poland, Portugal, Yugoslavia, Spain, Scotland, and Turkey.

Plague.—Reports of the occurrence of plague have been received from consular and medical officers stationed in Algeria, Azores, Canary Islands, Constantinople, England (epizootic), Egypt, France (Paris), Greece, Italy, Palestine, Portugal (pneumonic), Tunisia, and Syria, covering old endemic foci. The new areas involved, of which reports have been received, include the Island of Rhodes (Italy) and Prevesa and Patras, Greece.

COOPERATION OF THE CONSULAR SERVICE.

The cooperation of the Consular Service has been most helpful and satisfactory. Telegraphic information and weekly sanitary reports have been received from interior cities as well as from ports of embarkation throughout the year. These reports are the means by

which the office is kept informed as to the progress of epidemic disease. Accurate data regarding these diseases, of course, could not be obtained, and was not expected; but the information received was of value as indicating the areas involved and from which infection might be disseminated.

Summary of service operations in Europe.

Port.	Passengers inspected.	Vaccinated.	Bathed and deloused.	Pieces of baggage disinfected.
Antwerp, Belgium.....	27,617	27,617	24,633	26,096
Barcelona, Spain.....	218	176	26	370
Bergen, Norway.....	689	689	3	.....
Bremen, Germany ¹	9,843	5,885	2,182	2,825
Cherbourg, France.....	19,306	12,906	9,610	22,127
Christiania, Norway.....	10,419	9,145	69	140
Constantinople, Turkey.....	2,260	2,256	1,651	.....
Copenhagen, Denmark.....	8,941	6,387	1,266	1,219
Danzig.....	13,267	13,092	12,685	4,970
Genoa, Italy.....	4,165	4,156	3,510	2,899
Göteborg, Sweden.....	11,283	8,181	498	456
Hamburg, Germany ²	12,419	34,928	22,290	29,894
Havre, France.....	20,558	10,978	7,467	12,045
Riga, Latvia.....	2,663	2,662	2,662	1,396
Liverpool, England.....	41,250	6,452	235	956
London, England.....	1,985	726	165	611
Messina, Italy.....	53	53	45	28
Naples, Italy.....	46,321	46,321	46,321	48,071
Palermo, Italy.....	3,438	3,438	3,266	2,570
Patras, Greece.....	1,846	1,798	1,815	1,942
Piræus, Greece.....	2,924	2,609	88	2,639
Rotterdam, Netherlands.....	16,130	15,989	9,874	9,555
Southampton, England.....	26,553	15,915	1,378	8,320
Stavanger, Norway.....	704	544	5	6
Trieste, Italy.....	3,780	3,676	3,648	1,111
Total.....	318,700	236,579	155,455	180,246

¹ Figures are for transactions since Feb. 1, 1922.

² Figures include transactions at Bremen from July 1, 1921, through Jan. 31, 1922.

GUAYAQUIL, ECUADOR.

Acting Asst. Surg. Carlos V. Coello reports as follows:

During the fiscal year ended June 30, 1922, 202 bills of health were issued, corresponding to 80 vessels fumigated and inspected, to 95 inspected only, and 27 passed without inspection or fumigation.

The personnel inspected included passengers, first cabin, 1,602; second cabin, 154; steerage, 671; and crew, 12,623. All the passengers were destined for ports of the United States or the Canal Zone.

QUARANTINABLE DISEASES.

The following quarantinable diseases have been reported during the year in the port and vicinity:

Plague.—Seventy-two human cases with 20 deaths occurred during the year, all except one occurring in the city, as compared with 376 cases for 1921. The great decrease in the last few months is due, undoubtedly, to the increased activities of the local Public Health Service, as evidenced by the large number of rats caught (169,561, according to official reports). An average of 2.5 per cent of the rats examined were infected. It appears possible to keep the disease under control in Guayaquil if the measures in present practice are

carried on with perseverance and tenacity. Deratization and vaccination are the two main prophylactic measures now employed, and in addition to which the Ecuadorian public health service has laid special stress on rat-proofing old-fashioned construction. Efforts are being made to build the rats out, as well as to starve them by properly disposing of the garbage. Incidentally, the yellow fever campaign has contributed to plague control by depriving the rats of the water supply they formerly had in the tanks and other depositories, now closed and sealed to prevent mosquito breeding. The rats, lacking water to drink in the interior of the houses, look for it outside, with the result that they do not live so close to man, who, therefore, is less exposed to infection.

Smallpox.—Sixty-one cases of smallpox with one death were reported during the year: seven of them occurred in near-by towns. In contrast to former appearances of this disease is the low mortality, 1.60 per cent. No case has been reported during the last two months. Vaccination has been carried out extensively during the calendar year 1921, 26,014 individuals having been vaccinated in this city and vicinity.

Passengers of all classes for the United States or Canal Zone are required to show signs of recent antismallpox vaccination before they can purchase their tickets.

Other diseases.—Yellow fever: No case of yellow fever has been reported during the year, the last case having occurred in May, 1919. With the constant aid of the Rockefeller International Health Board, prophylactic measures, mainly the extermination of the mosquito, are carried on with laudable perseverance by the local health authorities.

Malaria: This disease, endemic in Guayaquil, and against which no prophylaxis is practiced, caused 634 deaths during the last calendar year, ranging next to *tuberculosis*, which, during the same period of time, killed 3,708 human beings in Guayaquil and vicinity.

Leprosy: As usual, a few cases go about the city unreported.

Fumigation of ships: Obeying instructions from the bureau and taking into consideration the desire of the Canal Zone health authorities, the fumigation of holds and crew quarters of ships bound for ports of the United States or the Canal Zone was discontinued, as they are thoroughly fumigated in Cristobal, Canal Zone, while empty, at regular and frequent intervals. This modification in the process of dispatching northbound boats has been of great benefit to the shipping interest and to travelers, who formerly suffered delays, expense, and discomfort on account of the measure. It is understood, however, that in the event of the reappearance of any suspicious case of yellow fever, complete fumigation of the entire ship will be reestablished for mosquito destruction.

HABANA, CUBA.

Acting Asst. Surg. Richard Wilson reports as follows:

The function of this office includes the issuance of bills of health in conjunction with the consular office to vessels proceeding to the United States and its dependencies, the reporting to the bureau of the sanitary condition of the port and vicinity, the supervision of the fumigation of vessels as required when destined to ports of the

United States, and the examination of American seamen applying to the consulate for assistance.

The total number of bills of health issued was 1,687. This activity was much reduced, owing to the operation of amendment No. 3 of the quarantine regulations granting exemption to vessels engaged exclusively in trade between Habana, Cuba, and Key West, Fla. During the year, 21 vessels were fumigated by the service force, and supervision was extended to the fumigation of 152 vessels performed by the Cuban quarantine service. Under the last-named circumstances this office issues fumigation certificates in the same manner as though the work were performed by the service force.

In the following table will be found the principal transmissible diseases reported in Habana during the fiscal year 1922. Malaria caused the highest morbidity (956 cases) and resulted in 16 deaths.

Principal transmissible diseases reported in Habana during the fiscal year 1921-22.¹

Disease.	July-December, 1921.		January-June, 1922.		Total, fiscal year 1921-22.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
1. Typhoid fever.....	213	51	144	20	357	71
2. Paratyphoid fever.....	5	2	13	2	18	4
2. Typhus exanthematicus.....	0	0	0	0	0	0
4. Malaria.....	716	10	240	6	956	16
9. Diphtheria.....	35	7	43	6	78	13
7. Scarlet fever.....	17	0	103	0	120	0
6. Measles.....	10	0	9	1	19	1
19. Chicken pox (varicella).....	12	0	173	2	185	2
5. Smallpox (variola).....	13	0	29	2	42	2
61a. Cerebro-spinal meningitis.....	7	4	1	2	8	6
17. Leprosy.....	0	0	2	1	2	1
16. Yellow fever.....	0	0	0	0	0	0
63. Poliomyelitis.....	3	2	1	0	4	2
1/1. Ictero. grave.....	1	0	0	0	1	0
24. Tetanus, infantile.....	4	4	0	0	4	0
27. Beriberi.....	0	0	1	0	1	0

¹ The deaths are included in the number of cases.

The water supply in Habana is insufficient in quantity and at times of questionable purity.

Smallpox, malaria, and typhoid fever prevail rather extensively in the eastern end of the island. Very serious efforts have been made by the Cuban sanitary department to control these diseases, and there has been a very decided improvement over the preceding year. The Cuban department of sanitation now issues reports, covering periods of 10 days, of all new cases of transmissible diseases and deaths occurring in municipal districts and provinces. These reports are transmitted to the bureau as received.

OPERATIONS OF THE SERVICE IN HAWAII.

Surg. E. A. Sweet, chief quarantine officer, submits the following report:

Substations are maintained at the ports of Hilo, Mahukona, Koloa, Ahukini, Lahaina, and Kahului.

There were nine cases of quarantinable disease during the current fiscal year. Three of the patients were suffering from leprosy and were traveling under prescribed regulations, hence no further restric-

tive measures were required. A fourth person, afflicted with leprosy, was a Japanese steerage waiter making his first trip at sea. The presence of a mild coryza and slight induration of the skin were deemed sufficient to warrant removal to quarantine and detention. Nasal smears were subsequently made and showed the bacilli in large numbers. The fifth leprosy case was in the person of a Japanese "picture bride."

Four cases of smallpox were noted. Two of these patients were removed at Yokohama with undetermined diagnoses, owing to the early stage of the eruption. Later this office was notified by the American consul general of the true character of the disease and the usual restrictive measures were instituted, namely, the vaccination of the personnel and the detention, to complete 14 days, of the unvaccinated or doubtfully vaccinated passengers destined to Hawaii. The remaining personnel were allowed to serve their period of detention en route to San Francisco. A third case of smallpox was removed from a trans-Pacific vessel at the Nagasaki quarantine station, and no measures were required at Honolulu. In the fourth instance the case proved to be lues.

During April a practicing physician in Honolulu reported that one of his patients had symptoms suggestive of smallpox. She was immediately seen by a representative from the quarantine office and the case was diagnosed as smallpox in the vesicular stage. The woman, a permanent resident of Honolulu, had never been successfully vaccinated. Returning from a visit to the Orient, she arrived in Honolulu on the steamship *Empire State* on March 31, having embarked at Hongkong. The vessel touched at Shanghai on March 19 and at Yokohama on March 24, at both of which ports there were probably opportunities for infection. Owing to the exceptional speed of the steamer, the elapsed time between all three ports and Honolulu was well within the period of incubation of the disease. The vessel was passed upon inspection, there being no history of infection aboard, but five days later the first symptoms in the passenger mentioned became manifest. This case is but illustrative of others which unquestionably will occur in the future. The very material reduction in the steaming time between oriental and American ports has increased the possibility of the introduction of infectious diseases, owing to the fact that infections with a 14-day incubative period do not have time to develop en route. This situation accentuates the necessity for strict precautionary measures at oriental ports of embarkation.

But 10 cases of typhoid were notified during the year, four of these occurring on a single vessel. It is reasonable to conclude that the infection in this particular instance originated on board ship, as determined by the period of incubation, but whether from an infected water supply or from a carrier could not be ascertained, as the vessel remained in port only a few hours.

DISINFECTION OF VESSELS.

Two vessels were disinfected for quarantinable diseases during the year. In addition there were 45 fumigations for the destruction of rodents or mosquitoes at Honolulu and subports, 33 having been

done at Honolulu, 11 at Hilo, and 1 at Kahului. A total of 184 rats was obtained. All of the fumigations at Honolulu, with two exceptions, were done with hydrocyanic acid gas. Where possible, vessels are remanded to the quarantine wharf for treatment by this method, the personnel being returned to the city, thus eliminating in part the dangers which may arise. As heretofore, vessels from South America and Mexico have been fumigated before entering port for the destruction of mosquitoes, 10 vessels having been so treated during the year.

PLAGUE AT SYDNEY.

The occurrence of a sharp outbreak of plague at Sydney (with which port Honolulu has direct connection through two lines of steamers) during the past year has been a matter of concern to this office. Vessels departing from Sydney have been systematically fumigated by the Australian health authorities. Fortunately, the four vessels of the two regular lines touching at Honolulu remain in this city only a limited number of hours and they are seldom at the wharf after 8 p. m., thus somewhat reducing the hazard. A large part of the cargoes of these vessels discharged at this port consists of frozen meats, which obviously are not likely to harbor rodents. In the case of freighters arriving from Australia and remaining in port a number of days, precautionary rodent measures have been exercised.

OCCUPANCY OF NEW QUARTERS.

Following the completion of the new Federal building, the quarters in the annex to the customhouse on the water front were vacated and service activities were transferred to the new center. Owing to insufficient space, the quarantine laboratory was not transferred to the new building.

COOPERATION WITH OTHER ORGANIZATIONS.

A total of 1,267 persons were cared for at quarantine during the year. The greater number of these—1,197—were held for various reasons, including illness and other causes, at the request of the Hawaiian Sugar Planters' Association. These people, consisting of Filipino and Porto Rican laborers, were fed and maintained at the expense of the sugar planters. Assistance was rendered by the service in making the necessary physical examinations and in special examinations for uncinariasis, as well as in rendering medical attention. Of the remaining persons cared for at quarantine, 44 were contacts who had been exposed to quarantinable disease, 7 were merchant seamen suffering from measles, mumps, and similar infections, while 19 were cared for at the request of the Territorial board of health.

STATION IMPROVEMENTS.

Upon completion of repairs to the wharf referred to in the last annual report, the disinfecting machinery on hand, consisting of two steam chambers and a boiler, was set up and has since been in operation. Bathing facilities were also installed, so that the station is now much better equipped to handle quarantinable infections than in the past several years.

PLAGUE PRECAUTIONARY MEASURES.

At the beginning of the fiscal year the force of the Territorial board of health which has carried on antiplague measures in co-operation with this service was reduced from seven trappers to four, owing to insufficient appropriations, and operations were continued with this reduced personnel. Inasmuch as the work is largely confined to the water-front area and is carried on almost solely for the purpose of affording information concerning infected rodents, no marked decrease in the general rat population of the city could be expected. The reduction in personnel has not interfered materially with the value of the work.

The total number of rodents taken during the year was 9,765. Of these 9,227 were trapped, 354 were shot from trees, and 184 were killed by fumigation, the largest number on any one vessel being 35. The rodents were classified as follows: *Mus alexandrinus*, 2,324; *Mus rattus*, 1,248; *Mus norvegicus*, 1,241; *Mus musculus*, 4,932; mongooses, 20. Upon examination, no lesions indicating plague were found.

The plague situation on the island of Hawaii, where measures of prevention are conducted by the Territorial board of health in co-operation with the various sugar plantations, has remained practically unchanged. Two cases of human plague were reported during the year 1921, one, of the bubonic type, at Kalopa on July 15, and the other, a pneumonic case, at Honokaa on November 18. In addition there were three cases of rodent plague. A total of 162,935 rodents were exterminated during the year, classified as follows: *Mus alexandrinus*, 19,924; *Mus norvegicus*, 19,835; *Mus rattus*, 26,970; *Mus musculus*, 72,303; mongooses, 1,365. The remainder were not classified. It is believed that this focus of plague infection, while of considerable importance to the residents of the territory involved, is, under present conditions, only of slight danger to shipping.

Summary of transactions, Hawaii.

	Hono- lulu.	Hilo.	Ma- hukona.	Ka- hului.	Lahaina.	Koloa.	Ahukini.
Vessels arriving.....	567	38	0	8	3	10	2
Inspected and passed.....	505	37	0	7	3	10	2
Boarded and passed.....	51	0	0	0	0	0	0
Fumigated and passed.....	9	1	0	1	0	0	0
Disinfected and passed.....	2	0	0	0	0	0	0
Crew inspected.....	65,940	1,657	0	231	119	269	43
Passengers inspected.....	93,386	741	0	0	0	0	0

OPERATIONS OF THE SERVICE IN THE PHILIPPINES.

Surg. C. J. McDevitt (R) in charge. Post-office address, P. O. Box 424, Manila, P. I.; telegraphic address, Quarantine, Manila.

During the current fiscal year this station was concerned in the handling of the following quarantinable diseases: Cholera, leprosy, plague, and smallpox.

The activities of the United States Public Health Service in the Philippines for the fiscal year 1922 may be classified as follows:

1. National quarantine.
 - (a) Incoming quarantine.
 - (b) Consular quarantine.
2. Interisland quarantine and supervision of interisland vessels.
3. Dispensary treatment of American seamen.
4. Hospital treatment of American seamen.
5. Sanitary supervision of vessels in port.
6. Sanitary condition of ports and contiguous shore.
7. Inspection of arriving aliens.
8. Veterans' Bureau activities.
9. Miscellaneous functions.

OPERATION AND EQUIPMENT.

Quarantine boarding and inspection is carried on at the following ports of entry upon the arrival of vessels at the following quarantine anchorages: Manila, Cebu, Cavite, Iloilo, Jolo, Olongapo, Zamboanga.

The two quarantine stations, one at Cebu and the other at Mariveles, proved adequate for the detention and treatment of vessels held in quarantine. The station of Mariveles is used for vessels arriving in the northern section of the islands, and the one at Cebu for the Southern section.

PERSONNEL.

The personnel engaged in the operations of the quarantine service and the care and treatment of American seamen comprised four commissioned officers, two acting assistant surgeons, and one pharmacist, the same force remaining on duty at the end of the fiscal year.

In addition to this, there were 65 attendants employed on quarantine work alone.

OUT-PATIENT DISPENSARY AND HOSPITALIZATION FOR AMERICAN SEAMEN.

Out-patient relief and hospitalization was furnished American seamen at the port of Manila only. Owing to the falling off in shipping, which was directly due to the world-wide depression of commerce, there was a corresponding reduction in this activity. Only 319 out-patients were treated, 389 treatments given. In addition, the service cared for all cases coming under the United States Employees' Compensation Commission.

All hospital cases of American seamen were cared for at St. Paul's Hospital in the city of Manila, regular officers having charge of the treatment of these patients. There were 136 American seamen admitted during the year and 8 remaining from the previous year, making a total of 144 persons hospitalized. There were 137 discharged, and there remained in the hospital on June 30, 1922, 4 patients. There were 3 deaths of American seamen undergoing hospitalization during the year. There were furnished 2,782 days of hospital treatment.

NATIONAL QUARANTINE.

Incoming quarantine inspection was conducted in accordance with the United States Quarantine Laws and Regulations of 1920 in a manner similar to that of previous years. The hours of inspection

have been maintained from sunrise to sunset, except in unusual cases, when one or two vessels were inspected after sundown. Daylight inspection in the Philippines is much more important than in the United States, owing to the proximity of ports infected with quarantinable disease. Extra vigilance is required, and it would be a mistake to change the hours of inspection in the Philippines. The incoming work for the fiscal year ended June 30, 1922, has been tabulated as follows:

Stations.	Number of vessels inspected.	Number of vessels fumigated.	Total number of passengers and crews inspected.
Cavite.....	44	0	5,729
Cebu.....	75	71	5,837
Iloilo.....	47	251	495
Jolo.....	39	0	3,352
Manila.....	775	181	129,043
Olongapo.....	2	0	195
Zamboanga.....	24	0	2,845

QUARANTINABLE DISEASES.

During the month of December, 1921, when there was an increase in the number of cases of cholera in the city of Manila, quarantine inspection of interisland boats was instituted and the special regulations pertaining to cholera (pars. 59 to 66 of the quarantine regulations) were enforced.

Toward the latter part of May there was a decided increase in the number of cases of human plague occurring in the port of Hongkong, and the Hongkong representatives of the service were requested to enforce special regulations covering plague at foreign ports. All vessels on the Hongkong-Manila run were fumigated every trip and the rats destroyed were examined for plague.

Early in June a more or less violent epidemic of human plague started in the port of Amoy, and immediately vessels on the Amoy-Manila run were fumigated each trip and the boarding officers were directed to institute a very rigid examination of all vessels from Amoy. In spite of this fact, however, a case of human plague was admitted on June 1, 1922, from the steamship *Taisang*. The *Taisang* left Amoy on May 30, arriving in Manila June 1. At the muster and inspection of crew and passengers by the boarding officer no case of sickness of any kind was discovered. A member of the crew, O. Cheng Suy, left the vessel the same day of its arrival and proceeded to his home in the city of Manila without having complained of illness. On the afternoon of June 3 he called a private practitioner and died about 11.30 p. m. of the same day. A diagnosis of plague was made and verified by post-mortem examination and confirmed later bacteriologically. While at Amoy this vessel had remained at anchor in the roadstead with rat guards on all lines to lighters. All the steerage passengers were deloused and their effects disinfected before going abroad. No further cases of plague developed on the *Taisang*, and it is probable that this case received its infection in Amoy. All rats examined following fumigation were found negative for plague.

During the month of December, 1921, while smallpox was epidemic at the port of Shanghai, one first-cabin passenger developed smallpox

nine days after arrival at the port of Manila. These two cases were the only cases of quarantinable disease that gained entrance to the Philippine Islands undetected during the fiscal year.

Routine fumigation of vessels was carried out throughout the year for the reduction to the greatest extent possible of the rat population of vessels arriving at the port of Manila. Requests were made, as in the past, to rat-proof the water front contiguous to the piers at this port and to carry on the campaign to keep down the rat population of this city to a minimum. The Philippine Health Service continued a systematic rat-catching campaign. All rats caught were examined for plague, but none was found positive for the infection during the year under report. All rats killed in fumigation also proved negative for plague. The total number of vessels fumigated was 503. The number of rodents killed in the fumigations was as follows: Rats, 990; mice, 371.

FUMIGATION OF VESSELS.

Fumigation was carried out at the several quarantine stations in the Philippines, primarily as an antirat measure, with the object in view of reducing to a minimum the number of rats on vessels. Experience in the Philippines seems to prove that this is by far the best and most efficient method of controlling the transmission of plague.

Ordinarily, vessels on direct run from Manila to plague-infected ports, such as Hongkong, Amoy, etc., are fumigated once every three months; but whenever there is an increase in the number of cases of plague at any port, fumigation is required every trip after discharge of cargo. On request from the captains of interisland vessels, fumigation is performed about once every six months, and at the same time general inspections are made of the sanitary conditions on board and instructions are given to the proper officers to maintain clean ships. The tabulation above shows the number of vessels fumigated at ports of the Philippine Islands.

SMALLPOX IN THE PHILIPPINES.

It was the practice for a number of years for all interisland steamship companies to send to our office the crews of their vessels for re-vaccination, and also to send the new members before signing them on. For several years past, however, the agents of these lines have been lax, and it was necessary to send out a circular letter requesting that all the crews of all interisland vessels be sent to the quarantine office for vaccination. This work was completed the latter part of May. The last case of smallpox reported among the crews of interisland vessels occurred June 17, 1918. The quarantine service in the Philippines continues to vaccinate all arriving steerage passengers from abroad, regardless of their port of departure. The last case of smallpox in Manila occurred December 11, 1921.

During the past 12 months, the quarantine officers at the port of Manila alone vaccinated 14,982 members of crews and passengers on arriving vessels.

CHOLERA.

During the fiscal year under report, an increase in the number of cases of cholera in the city of Manila began early in December, 1921,

and assumed epidemic proportions shortly afterwards. The bureau was advised by cable of the presence of this disease, and special measures were instituted at this port in accordance with the regulations. Several countries, among them the Dutch East Indies, the British Colony at Hongkong, and Australia, quarantined against the port of Manila during this epidemic, in spite of the fact that every precaution was taken by this service to prevent either a case of cholera or a carrier leaving the Philippine Islands. This is mentioned because outgoing quarantine at the infected port is much more efficient and a better procedure than that of attempting to prevent the introduction of such disease at the port of arrival. In other words, an efficient outgoing quarantine should induce other countries to expedite the handling of ships which have been properly treated before departure, instead of placing obstacles and hardships in the way of such vessels.

IMMIGRATION MEDICAL INSPECTION.

In addition to their quarantine duties, the officers at this station are charged with the medical examinations of immigrants. Examinations are made whenever aliens are presented by the proper officials, either on board arriving vessels or at the detention station at the customhouse. The largest part of this work constituted the examination of arriving children of domiciled aliens, a special examination being necessary to determine the age of these applicants for admission to the country.

AID TO OTHER SERVICES.

Aid furnished other services of the Philippine government was as follows:

1. *Bureau of Customs*.—Physical examination of seamen and examination of candidates for marine licenses; examination of arriving aliens and medical service to same when necessary; dispensary treatment and first aid to employees; and certification of probable age of children of domiciled aliens and treatment of seamen referred by the insular collector, acting as American consul of the various ports.
2. *United States Shipping Board*.—Examination and certification of prospective employees; inspection of foodstuffs on board vessels as to quality, and whether fit for consumption as food; examination of candidates for the officers' school of the board; and dispensary and hospital treatment of seamen.
3. *Bureau of Education*.—Examination of candidates for entrance to the nautical school.
4. *Bureau of Health*.—Fumigation and disinfection of vessels carrying lepers to and from Culion leper colony and furnishing transportation to the field force, and furnishing transportation for official business (provincial government).
5. *Bureau of Agriculture*.—Disinfection of vessels engaged in the transportation of infected cattle.
6. *Weather Bureau*.—Displaying typhoon signals as an aid to vessels during typhoon season.
7. *Bureau of Commerce and Industry*.—Maintaining light as an aid to navigation at Mariveles.
8. *Food and Drugs Board*.—The authentication of all certificates covering meats or meat products imported into the Philippines.

PROPERTY.

The financial condition of the Philippine government having improved but little, if any, during the past 12 months, it has been impossible to requisition for the necessary property to reequip our two quarantine stations. In the last annual report it was shown that

considerable property had been condemned and never replaced, and it was hoped that some of this property might be replaced during this year. This, however, has been impossible. The floating equipment of the Bureau of Quarantine Service at the ports of Manila, Cebu, and Iloilo is in very poor shape and requires extensive repairs. The launch at Cebu has recently become unseaworthy, and it will require from six to eight thousand pesos to put it in repair. The launch at Iloilo is also in urgent need of repairs, which will undoubtedly total somewhere close to ₱6,000. The *Zapote* has not been on the ways for almost a year, and is in urgent need of repairs to her copper bottom. This boat, however, has reached the stage where it would be cheaper to sell or condemn her and replace with a modern seaworthy tug. From June 1 to October 1 the weather in Manila Bay is very tempestuous, and it is very dangerous to board from a launch which is not in the best of condition or one which is too small. Present indications are such that it will be impossible to obtain the necessary funds from the Philippine government within the next few years for the purchase of a suitable boarding launch for the port of Manila.

OPERATIONS OF THE SERVICE IN PORTO RICO.

Surg. C. M. Fauntleroy, chief quarantine officer, in charge. Post-office and telegraphic address, San Juan, P. R. Quarantine stations are maintained at the following-named ports: San Juan, Ponce, Mayaguez, Aguadilla, Fajardo, Humacao, Arecibo, Guanica, and Central Aguirre.

The activities of the Public Health Service, under the direction of the chief quarantine officer, embrace the following: (1) National quarantine; (2) antiplague measures; (3) marine-hospital relief; (4) Veterans' Bureau business; (5) medical inspection of aliens; and (6) miscellaneous.

NATIONAL QUARANTINE.

The chief quarantine officer is stationed at the port of San Juan, where the service maintains a fully equipped quarantine station, with suitable facilities for the detention of personnel and apparatus for disinfection and fumigation. A small hospital is also provided for the proper isolation of persons with quarantinable diseases. The quarantine procedure at the subports is conducted by acting assistant surgeons, and includes the inspection of vessels and the issuance of bills of health. In the event of the occurrence of quarantinable diseases on vessels at the subports, such vessels and the personnel are remanded to the quarantine station at San Juan, where the necessary treatment of the vessels and personnel is conducted. The only quarantinable disease observed during the past year was a plague-infected rodent on a tugboat, the *San Luis*, operated by the United States engineers in connection with the dredging of San Juan Bay. This infected rat got on board this vessel at San Juan because of the failure to exercise proper precautions while the boat lay alongside of the wharf.

The quarantine transactions in Porto Rico may be summarized as follows:

	San Juan.	Subports.
Vessels inspected.....	362	397
Vessels fumigated.....	287	18
Crews inspected.....	15,638	9,672
Passengers inspected.....	10,050	3,481
Bills of health issued.....	837	1,461

ANTIPLAGUE MEASURES.

The antiplague measures adopted by the Public Health Service at the beginning of the outbreak of plague at San Juan in February, 1921, were vigorously enforced until March 15, 1922, after which date the bureau directed that the procedure be modified in certain respects, because of the improvement in the plague situation in Porto Rico. The Governor of Porto Rico, upon the recommendation of the commissioner of health, issued a proclamation on April 12, 1922, declaring Porto Rico to be free from plague infection. The last case of human plague occurred August 30, 1921, at Caguas, and the last case of rodent plague occurred September 8, 1921, at San Juan. The total number of cases of human and rodent plague which occurred during the epidemic is as follows:

Human plague.		Rodent plague.	
Place.	Cases.	Place.	Cases.
Bayamon.....	1	Bayamon.....	1
Caguas.....	2	Carolina.....	1
Carolina.....	4	Manati.....	3
Manati.....	2	Fajardo.....	1
Arecibo.....	1	Rio Piedras.....	6
San Juan.....	15	Puerto de Tierra.....	11
		Santurce.....	23
		San Juan.....	43
Total.....	25	Total.....	89

MEDICAL INSPECTION OF ALIENS.

In the absence of any facilities to expedite the medical inspection of arriving aliens it is necessary to conduct these examinations on board of vessels. No opportunity is allowed for the proper observation of suspicious cases, owing to the failure of the United States Immigration Service to make provision for the detention of aliens for the period of time required to complete the examinations in accordance with the United States laws and regulations governing the medical inspection of aliens. During the year, 8,032 alien passengers and 10,858 alien crews of vessels were medically inspected, and medical certificates were issued as follows: Class A-1, 0; class A-2, 2; class B, 26; class C, 0.

MISCELLANEOUS.

In addition to the routine activities of the service, the following improvements were effected at the quarantine station at San Juan: (1) Detention facilities considerably increased; (2) about 1 kilometer of roadways repaired and the station connected to the mainland by an excellent macadam road; (3) storage facilities for excess property increased by additions made to existing structures; and (4) construction of a garage to accommodate two automobiles.

PROGRESO, MEXICO.

Acting Asst. Surg. H. E. Gimler reports as follows:

During the current fiscal year this station was concerned with the inspection of passengers embarking from this port for ports in the United States, the inspection of crews on ships dispatched from this port for ports of the United States, and the fumigation, for the destruction of mosquitoes, of all vessels going to the southern ports of the United States during the closed quarantine season.

No cases of yellow fever were reported in this district during the past year.

VERA CRUZ, MEXICO.

Acting Asst. Surg. Percy Ahrons, in charge:

During the fiscal year the operations of this office have been directed chiefly against plague, yellow fever having been of less concern than in former years. The extensive antimosquito work carried out by the International Health Board has resulted in the reduction of the yellow-fever prevalence and permitted relaxation of quarantine restrictions against vessels sailing for ports of the United States.

During the fiscal year 1922, cases of yellow fever contracted, in part in the city and in part imported, numbered 20. There were 5 cases of rodent plague, but no human cases. Three hundred and twenty-two vessels departed for ports of the United States or its possessions, and of this number 232 were fumigated for the destruction of rodents and mosquitoes. Bills of health were withheld in three instances because of violation on the part of the master of outgoing quarantine requirements. There were inspected 1,012 passengers and 12,857 members of crews. The inspection of passengers included the use of thermometer, and any person having a rise of temperature above 38 was refused passage by the agents on recommendation of the service representative. Several cases of unknown fever were thus rejected. The service representative rendered professional service to the consular office with respect to seamen applying to the consulate for aid.

The quarters of the United States Public Health Service, which formerly were wholly inadequate, have been moved to another part of the consulate and are much more satisfactory than in the past.

VIRGIN ISLANDS.

Surg. D. C. Turnipseed, chief quarantine officer, in charge. Post office and telegraphic address, St. Thomas, Virgin Islands.

During the current fiscal year this station was concerned with the quarantinable diseases smallpox, leprosy, plague, and yellow-fever, as follows:

Smallpox.—On account of the prevalence of smallpox in Santo Domingo and Haiti, the passengers and crews of sailing vessels from those ports have been required to be vaccinated before landing. One case of and one death from this disease occurred in St. Thomas during the year. This case was imported from San Pedro de Macoris, Dominican Republic, and occurred on the thirteenth day after embarkation.

Leprosy.—One case of leprosy, in transit from Saba, Danish West Indies, to Curacao, Danish West Indies, was observed during the year. This case was isolated on board the Dutch schooner *Estelle*, and was not allowed to land in the Virgin Islands.

Plague.—Five vessels were detained in quarantine during the year for fumigation, on account of failure to comply with quarantine regulations while previously in a plague-infected port.

Yellow fever.—On December 3, 1921, an American tank steamship from Tampico, via Vera Cruz, Mexico, arrived with four cases of fever on board. At the time of departure from Tampico three cases of yellow fever were reported at that port. The precaution was taken to detain the vessel a few hours until a bacteriological examination could be made. These cases were found to be microscopically positive for malaria, and as there were no mosquitoes aboard, the vessel was granted pratique.

GENERAL QUARANTINE TRANSACTIONS.

St. Thomas.

Number of vessels inspected and passed.....	455
Number of vessels boarded and passed.....	14
Number of crew inspected.....	11,708
Number of passengers inspected.....	6,480
Total fees collected for inspections and fumigations of vessels and vaccinations of personnel.....	\$4,127.75
Number of bills of health issued.....	221
Number of vessels fumigated.....	9
Number of personnel vaccinated.....	186

Frederiksted.

Number of vessels inspected.....	28
Number of crew inspected.....	1,846
Number of passengers inspected.....	1,793
Number of bills of health issued.....	127
Total fees collected for inspections of vessels.....	\$407.00

Christiansted.

Number of vessels inspected.....	6
Number of crew inspected.....	85
Number of bills of health issued.....	36
Total fees collected for inspections of vessels.....	\$24.00

IMMIGRATION.

Inasmuch as the United States immigration laws are not effective in the Virgin Islands, there have been no transactions for this service during the past fiscal year.

REPAIRS TO PROPERTY.

The usual routine repairs were made to the buildings and structures on the quarantine reservation and to the floating equipment. All appear to be in a good state of preservation.

MEDICAL INSPECTION OF ALIENS.

During the fiscal year ended June 30, 1922, there were examined by medical officers of the Public Health Service 551,454 immigrants for the purpose of detecting physical or mental defects or diseases, as provided for in the United States immigration laws. This shows a decrease of 586,228 as compared with 1,137,682 for the previous year. In addition to the immigrants examined, 783,193 alien seamen were inspected, as provided for in the act of February 5, 1917. The reduction in the number of immigrants examined was largely due to the application of the "three per centum law."

The total number of immigrants certified to as having defect or disease was 25,815—541 were found to be suffering either with mental defects or tuberculosis; 1,243 as being infected with "loathsome contagious" or "dangerous contagious" diseases; 17,172 as having some physical defect which would interfere with their ability to earn a living; and 6,859 as having minor physical defects. Of the alien seamen found defective, 68 were certified for tuberculosis or mental conditions; 2,423 as being afflicted with "loathsome contagious" or "dangerous contagious" disease; 1,805 for conditions that would affect their ability to earn a living; and 418 for minor defects.

The reduced number of aliens applying for admission has permitted a more critical examination. Especially at Boston and New York, the ports which receive practically all of the European immigrants, examinations were made in a more leisurely manner than formerly, with the result that a greater percentage of disease and physical defects was found. From a total of 282,000 immigrants examined at Ellis Island, approximately 16,800, or 5 per cent, were certified to. Of the 708 cases afflicted with "dangerous contagious" or "loathsome contagious" disease (including 490 certified to during the year plus 218 cases pending on July 1, 1921), somewhat less than one-half were deported. Of the 16,204 found to be suffering from physical defects, 585 were deported. Of the grand total of 16,828 immigrants certified to at Ellis Island as being mentally defective, tuberculous, afflicted with "dangerous contagious" or "loathsome contagious" disease, or physical defects, 709 altogether were debarred from entry. The number of certificates rendered at Ellis Island for mental defects was 99, from a total examined of 282,000.

Admittedly, the procedure at ports of entry for detecting mental defects amongst arriving aliens is far from perfect. This is due in part to inadequate facilities and insufficient space for holding large numbers in detention and under observation, and in part to a limited force of medical examiners skilled in the detection of mental defectiveness. The main difficulties, however, were fundamental in nature, especially with respect to detection of those afflicted with neuropsychoses. Practically 50 per cent of the alien born admitted to the New York asylums have resided in the State sufficiently long to secure naturalization without their condition becoming evident to

their associates, and the difficulty in the detection of this class of cases during the limited opportunity afforded for their examination at the time of entry is plainly evident. Probably the majority of feeble-minded are recognized, and all idiots and imbeciles; but in the examination of persons speaking alien tongues and emotionally disturbed because of the new environment, it is no easy matter for the medical examiner working through interpreters to gain a correct estimate of the mentality of the immigrant.

To the casual observer whose knowledge of conditions connected with the immigration problem is gained by a brief visit to Ellis Island, it might appear that some infallible system could be evolved for the weeding out of the mentally unfit, but to those who have given years of earnest study to the problem the remedy does not appear so easy of application. As succinctly set forth in the "Manual for the Mental Examination of Aliens," the immigrant generally appears for examination as to his mental condition without the examiner being possessed of the aids that ordinarily enter into the determination of such a question. The history of his family, as well as his personal history, is unknown and unobtainable. His previous environments can only be estimated or suspected. His friends and relatives, as well as himself, are unwilling to lend their cooperation, and the statements which are made by them must all be accepted with suspicion; for, as experience has shown, they are more interested in securing entry of the alien than in assisting in obtaining the truth. Moreover, the question of language and of race adds much to the difficulty of the situation. It would be ideal for the examiners themselves to be well versed in the languages and customs of the suspected aliens, as otherwise they will miss some cases which should be obvious. Even with a careful, well-trained interpreter, much is lost in any examination of an insane person. Certain significant expressions and tones of voice can not be translated, and many things which would be of greatest significance to a psychiatrist mean nothing to an interpreter, and therefore remain untranslated. This is a serious handicap in those cases in which delusions are not freely expressed, and which show no physical signs or eccentricities of behavior or conduct and little, if any, deterioration. Some interpreters are temperamentally unfit to aid in a mental examination because they lose their temper and raise their voice when receiving wrong answers.

A very substantial enlargement of the quarters at immigration stations so as to permit of the detention and observation of a greater number of aliens without hopelessly obstructing the incoming tide or tying up commerce would, of course, be helpful and probably result in the detection of a greater percentage of feeble-minded or insane aliens. Were such facilities available, the additional examining personnel would be forthcoming.

A very serious handicap in the conduct of the medical examination of aliens has been in the lack of adequate detention and hospital facilities at immigration stations. With the exception of Ellis Island and San Francisco, for the most part the Government, operating through the Immigration Service, depends for the hospitalization of sick aliens, or those subject to observation for definite determination of diagnosis, upon local hospitals, and this results in a very considerable dissipation of medical personnel, whose time is

taken up in visiting various hospitals located throughout the city for repeated examinations of aliens undergoing treatment pending their admission or deportation.

Another serious inadequacy is the lack of laboratory facilities and similar diagnostic aids for the medical examiners. As a rule, there is a sad lack of transportation facilities at most of the stations, so that the medical examiners and immigration inspectors are required to cover wide stretches of water front with a corresponding loss of time. If satisfactory boarding facilities were provided, so that the examination of incoming aliens when made on board vessels could take place at some centralized point, there would be a great saving of administrative personnel. Through cooperation between the Bureau of Immigration and the Public Health Service, this condition of affairs has been, to some extent, mitigated at various ports. Quarters have been furnished to immigration inspectors at the New Orleans, Galveston, and New York quarantine stations. At New Orleans and Galveston the examination of aliens is effected at the quarantine anchorage where the vessel enters, and similar arrangements apply at New York with respect to nonpassenger-carrying vessels. The service also provides launch transportation to the Immigration Service at Port Townsend, Honolulu, Portland, Me., Providence, R. I., and several other ports of lesser importance.

Furthermore, at a number of ports where no immigration hospital is provided for the reception of diseased alien seamen, the Public Health Service has endeavored to extend the utmost cooperation, and, so far as its more immediate obligations permit, has accepted these diseased alien seamen at the hospitals for care and treatment pending their final disposition by the Immigration Service. Under these conditions the diseased alien is advised that he must not leave the institution; but it is well recognized that Public Health Service officers are not vested with police power, nor have they recourse should the alien, as not infrequently happens, leave the grounds for a period more or less temporary but which, at the same time, permits him to mingle with the public. With respect to the imposition of custodial restraint, the same defect exists in the case of diseased alien seamen sent to private institutions. The immigration law contemplates that arriving aliens afflicted with conditions that will operate to their exclusion should be held under the supervision and custodial restraint of the immigration authorities, and unless they are detained, therefore, in institutions controlled by the immigration authorities this restraint can not be other than purely nominal.

Not infrequently aliens, be they seamen or immigrants, present conditions on primary examination of such character as will not permit of an immediate diagnosis being made, and further observation is required pending laboratory tests. The proper conduct of immigration examinations will, therefore, necessitate the enlargement of immigration stations at a number of ports so as to include hospital facilities and clinical laboratories.

CLONORCHIASIS.

The subject of clonorchiasis has been one that has caused considerable trouble. Because of the exclusion of a considerable number of Chinese merchants afflicted with this infection, more or less pres-

sure has been exerted to have the existing medical regulations amended so as to eliminate clonorchiasis as a "dangerous contagious" disease that renders deportation mandatory.

Clonorchiasis was included in the revised regulations governing the medical inspection of aliens as a "dangerous contagious" disease, because it is an infection for which no remedy is known. The disease is essentially chronic in character, mild in some instances, and quite severe in others, with a tendency to ultimate invalidism and with a reported mortality, at least in the Orient, of from 16 to 20 per cent. Presumably the greater proportion of persons infected died from some intercurrent malady. It is transmitted through the medium of two fresh-water hosts, fresh-water snails and trout, both of which exist in the United States; and there appears to be no good reason why this disease should be characterized other than as a "dangerous contagious" one, rendering the infected alien subject to exclusion. It has been the uniform policy of the Government in case of doubt to operate in the interests of the Government and not in the interests of the alien, and until it has been definitely proved, therefore, that fresh-water snails in the United States can not act as intermediate hosts of this parasite it is deemed to be unjustifiable to make any change in the existing regulations.

Most of the cases of clonorchiasis have been apprehended among Chinese and Japanese passengers arriving at the ports of San Francisco, Seattle, and Boston. It is particularly interesting to note, however, that during the fiscal year, at San Francisco, of 164 Chinese seamen examined because of their expressed desire for shore leave, 56 were found to be afflicted with clonorchiasis.

Certain investigations have been made as to alleged cures for this disease, such as exposure to deep X-ray penetration, intravenous doses of antimony, and carbon tetrachloride, but none of these remedies was found to be of value. The main effect of the X-ray treatment was the production of a large number of ova in the stools.

Immigrants inspected and certified at all ports and places in the United States and its dependencies and in Canada.

Place.	Number of aliens ex- amined.	Immigrants certified.				Important diseases for which certification was made.										
		Class A.		Class B: Disease or defect which affects ability to earn living.	Class C: Disease or defect of less degree.	Total.	Tubercu- losis.	In- sanity.	Idiocy.	Imbe- cility.	Epi- lepsy.	Feeble- minded and psycho- pathic inferi- ority.	Favus.	Syph- ilis.	Soft Gor- rhea. chan- cre.	
		(1) Idiocy, imbe- cility, feeble- minded, insan- ity, epi- lepsy, and tuber- culosis.	(2) Loath- some con- tagions or dan- gerous tagions disease.													
Alto, Ariz.	6		1	2		1	1									
Baltimore, Md.	280					2										
Bellingham, Wash.	0															
Biscayne Bay, Fla. (quarantine).	4, 635															
Blaine, Wash.	124	17	2	16	8	43					1	6				
Boston, Mass.	5, 972	5	30	451	258	747	12	5	2					1	4	2
Brownsville, Tex.	6, 102	15	52	201	20	291	40	1			2	7		1	1	6
Brunswick, Ga.	0															
Buffalo, N. Y.	9, 971	19	5	355	86	465	2	8	1		2	5				4
Calais, Me.	108	2	1	8	4	15						1		1		3
Calais, Calif.	668	1	7	2		10						1		3		3
Charleston, S. C.	11															
Columbia River, Ore. (quarantine).	18															
Columbus, N. Mex.	185															
Del Rio, Tex.	2, 389	2	1	13	16	16		1				1			1	
Detroit, Mich.	3, 111	55	23	118	181	380	4	10	9		1	35		7		12
Douglas, Ariz.	2, 162		12	1	13	13	8							4		
Duluth, Minn.	7, 171	1		21	12	34					1	1		3		1
Eagle Pass, Tex.	9, 800	8	5	21	33	67	1	6			1	1		1		2
Eastport, Idaho.	1, 911	2	2	54	11	69		1			3	1		4		8
El Paso, Tex.	22, 393	8	17	262	89	376		2	2						2	
Fall River, Mass.	1															
Freeport, Tex.	0															
Galveston, Tex.	191		1			1								1		1
Gloucester, Mass.	2															
Haltex, Nova Scotia.	3, 987	0		40	43	89		1	1	1		2				
Hidalgo, Tex.	18, 951	3	25			28	24	3								
Honolulu, Hawaii.	4, 396	2	1	67	14	84		1						1		1

Immigrants inspected and certified at all ports and places in the United States and its dependencies and in Canada—(Continued).

Place.	Num-ber of ex-amin-ed.	Immigrants certified.				Important diseases for which certification was made.											
		Class A.		Class B: Disease or defect which affects ability to earn living.	Class C: Disease or defect of less degree.	Total.	Tra- choma.	Tu- bercu- losis.	In- sanity.	Idiocy.	Imbe- cility.	Epi- lepsy.	Feeble- minded and psycho- pathic inferi- ority.	Favus.	Syph- ilis.	Soft chan- cre.	Gonor- rhea.
		(1) Idiocy, imbe- cility, feeble- minded, insan- ity, epi- lepsy, and tuber- culosis.	(2) Loath- some or dan- gerous con- tagious disease.														
Tampa, Fla.	1,057																
Tampa Bay, Fla. (quarantine)	67					4											
Tia Juana, Calif.	889			4			8						3		15		7
Tucson, Ariz.	160	1	30	4		38							1				
Van Buren, Mo.	149	2	1	13		16				1			3				2
Vancouver, British Columbia.	1,626	17	8	64	9	98	6	6	2	1		3	5				
Victoria, British Columbia.	1,975	3		14	36	53						1	1	2			
Wilmington, N. C.	0																
Wilmington, N. C.	8,604	41	10	1,011	27	1,119	4	26	3			3	1		2		4
Winnipeg, Canada.	27,789	2		18	58	78		1	1								
Yarmouth, Nova Scotia.																	
Total	551,454	541	1,243	17,172	6,859	25,815	425	159	98	11	27	28	486	75	141	28	241

REPORTS FROM IMMIGRATION STATIONS.

BALTIMORE, MD.

Surg. M. K. Gwyn reports as follows:

During the fiscal year ending June 30, 1922, 1,005 ships were inspected and 510 certificates issued for diseased conditions or physical defects among 15,960 alien seamen.

The following table gives a comparison of the quarantine statistics for the fiscal years 1921 and 1922:

	1921	1922
Ships inspected.....	1,507	1,005
Crews inspected.....	35,084	15,960
Passengers inspected.....	244	230
Class A(1) certificates.....	3	7
Class A(2) certificates.....	518	181

There appears to have been a satisfactory falling off in the number of cases of venereal disease detected on vessels from foreign ports. It is said that crews are carefully inspected at foreign ports before sailing, and those having venereal disease are eliminated.

Passenger traffic is very small, owing to the fact that there are no regular lines of passenger steamers from foreign ports arriving at the port of Baltimore.

BOSTON, MASS.

Acting Asst. Surg. A. J. Nute, in charge, reports as follows:

During the fiscal year ended June 30, 1922, 1,245 vessels arrived at the port of Boston from foreign ports. Of these, 834 were inspected by request of the immigration authorities; 5,972 alien passengers and 37,761 seamen were inspected, and medical certificates were issued against 747 passengers and 579 seamen.

Immigrants from every continent and many of the tropical islands arrived during the year. While the numbers were not as large as those of the preceding year, the sifting-out process had to be carried on with unusual care and a decided increase in laboratory work became necessary.

Passenger service between British ports and Boston has been resumed by a number of lines that discontinued such service during the war. The traffic has consisted largely of second and third class passengers. Although the decrease in number of arrivals was apparent under the 3 per cent act, the work of actual examination increased owing to the large proportion of aged and border-line types of aliens.

With the cooperation of the commissioner, the practice of inspecting alien second-class passengers on the dock has been continued wherever possible. It has been a success from a public health service point of view, although it has never had the approval of the transportation companies. By this method the problem of separating citizens from aliens has been solved, alien inspection has been expedited, and a distinct increase in the number of certificates issued has resulted.

In April Boston became a port of entry for Chinese under the immigration law. Formerly it had only been a port of entry under the

Chinese exclusion act. In the months of April, May, and June 143 Chinese passengers were presented at this office for examination by the Chinese Bureau. With the limited facilities available, Chinese inspection became a new problem. After several discussions the Immigration Service furnished sufficient equipment to make satisfactory tests. As a result, 91 Chinese were found to be infected with various types of intestinal parasites. There were 12 cases of clonorchiasis and 25 of uncinariasis. In some cases the infections were so mixed that aliens were veritable walking zoological gardens. A number of cases of hookworm infection were also found among passengers from Jamaica and Central America.

Conditions similar to those reported in the past from San Francisco were verified here. Many cases had no clinical symptoms whatever attributable to the disease. Differential blood counts in a number of instances showed a high normal number of red cells and normal hæmaglobin. Eosinophilia was sometimes absent when parasites were found.

Uncinariasis having been placed in class B, it has been the custom to allow most of the cases to have treatment. Whatever may have been the results in other sections of the country, experience here has indicated that it is not altogether a simple condition to cure. The patients were hospitalized and, under usual precautions, given a fairly intensive course of salts and thymol, reinforced with sodium bicarbonate. Some cases were given chenopodium in addition. A cure effected in one month was considered a rapid result. The possibilities of carbon tetrachloride have not yet been tried at this station.

Whipworms and roundworms were found in the vast majority of persons examined. Formerly these have been classed as minor infections. Recent investigators report that the more common intestinal worms are not so harmless as generally believed. It is suggested that all aliens affected with the so-called minor infections should be treated and cured before being permitted to land.

The same problems previously reported, relative to boarding arriving vessels, transportation facilities, and supervision of hospital cases, continue, owing to the location of the immigration station. Considering the highly important part the medical inspection of arriving aliens plays in the enforcement of the immigration laws, the quarters and facilities furnished the Public Health Service are not satisfactory for conducting its functions to the best advantage. Boston has excellent hospitals and can furnish service at a per capita rate far below the cost of maintaining an immigrant hospital.

Housing conditions should be considered. Aliens are detained for weeks and months awaiting disposition of their cases. Nothing in the immigration law places authority or responsibility on service officers for sanitary conditions at immigration stations or for the care of detained aliens on whom medical examination has been completed.

In order to cooperate with the Immigration Service as far as possible, and agreeable to the commissioner, supervision of detained aliens has been assumed, and thereby certain responsibilities for health of the detained persons and the hygienic conditions of detention quarters. Considerable time of the medical officers has been diverted from the strictly legal duties of examining arriving aliens to the care of the detained and to the devising of methods to check the spread of disease.

Daily inspections have been made and children's temperatures taken; but without adequate outdoor exercise and proper recreation and bathing facilities, certain diseases are bound to occur. Several times during the year epidemic cerebrospinal meningitis appeared, principally among colored immigrants from Providence and New Bedford, but there were also a few cases among Chinese. In one outbreak the type was so virulent that all stricken with the disease (four) died within three days of onset, although they were detected early, promptly hospitalized, and given large doses of serum. The detention quarters were repeatedly searched for carriers, but all cultures proved negative. Nevertheless, persons exposed were given nasopharyngeal applications of 5 per cent argyrol. The commissioner was given appropriate advice, and each outbreak was promptly suppressed. From time to time isolated cases of the exanthemata, mumps, diphtheria, and scabies occurred, but spread of any of these diseases was prevented by prompt removal to hospital.

Detained aliens arriving at New Bedford, Providence, and other subports of the district are housed at this station with detained Boston passengers and warrant cases. Many, if not the majority, of these cases are of abnormal physical or mental makeup, and, while not usually requiring hospital care upon arrival, they constitute an important factor in making a difficult medical and sanitary problem. The commissioner and his assistant have at all times been willing to furnish any necessary medical supplies and to transfer the afflicted to appropriate hospitals.

Three hundred and sixty-nine cases were removed to various hospitals in Boston and kept under the supervision of the service. Of the number admitted five died. Causes of death were cerebrospinal meningitis, 4; acute yellow atrophy of the liver, 1. At the end of the fiscal year 65 cases were remaining in hospitals.

Inspection of crews generally renders the services of one of the three medical officers unavailable for any other duty from 7 a. m. until sunset, and not infrequently the services of the second officer are required when vessels arrive in groups, or for inspection at one of the subports. Vessels were inspected at the subports of Lynn, Salem, Beverly, Weymouth, Quincy and Plymouth, Mass. Special inspection was given 12,762 alien seamen, and 120 were found infected with venereal diseases. Fifty-seven cases of trachoma were found. The marine hospital has been able to care for the majority of these aliens. With the seamen, as with the passengers, the medical examination is the corner stone of the immigration law. As a rule, when any privacy could be obtained there was no objection raised by any members of the crews to visual inspection. When objection was made, or a seaman was unable to appear on account of illness, the nature of which could not be definitely stated, the words "medical incomplete" were placed against the individual's name on the crew list. This procedure made the alien technically inadmissible for the time being and placed the responsibility of guarding said alien upon the transportation company, subject to the law applying to escaping inadmissible aliens, or of producing same for completion of examination at such time and place as the immigration officials shall designate. This removes any temptation to pass a doubtful case, and also prevents the disposition of any sick alien seamen except by permission of immigration authorities.

Approximately 300 reexaminations of aliens have been made at this office at the request of the Immigration Service. This includes medical board cases, temporarily landed aliens, and warrant cases.

EL PASO, TEX.

Passed Asst. Surg. J. W. Tappan, in charge, reports as follows:

Immigration at this port, mostly Mexican, has progressed steadily throughout the past year, and was particularly heavy during the last several months. The numbers during these months approximated those admitted during the period of the World War, when labor was in such demand in this country, and this despite the fact that the head tax and literacy test were no longer waived for any of the classes. The laborers have, in a large measure, been employed by the railroads.

During the year 22,393 immigrants were examined at the immigration station. There were 35,183 vaccinations performed in the regular routine of immigration work. Certificates for disease or defect, physical or mental, to the number of 376, were issued as follows:

Under class A (1): Insanity, 2; psychopathic constitutional inferiority, 1; epilepsy, 3; tuberculosis, 2. Under class A (2): Favus, 3; venereal disease, 14. Under classes B and C there were issued, respectively, 262 and 89 certificates.

Aliens held in detention at the immigration station are given medical attention and general hygienic supervision. They are bathed weekly, and their clothing and bedding are disinfected at the quarantine station. No serious cases of illness have appeared among them.

GLOUCESTER CITY, N. J.

Surg. D. E. Robinson, in charge, reports as follows:

Immigration at the port of Philadelphia showed a marked decline from that of the year preceding, due, in great measure, to the operation of the immigration restriction law. The total number of alien passengers examined was 3,633, of whom 97 were certified for mental or physical defects.

The bulk of the work at this port consisted in the examination of alien seamen. The total number of vessels inspected was 1,083, carrying alien crews to the number of 30,194. Two hundred and sixty-five certificates were rendered for physical and mental defects among alien seamen, of which number 162 were for venereal infections. A remarkable improvement was noted in this respect over the fiscal year ended June 30, 1921, in which year 321 seamen were certified for venereal disease. The great decrease of venereal infection among seamen is believed to be due to the greater precautions taken by the steamship companies to prevent the shipping of men already infected in order to reduce to a minimum the bills for hospital treatment at the port of entry.

The crews, for the most part, are examined at the docks, which are strung along the Delaware River from Claymont, Del., to Port Richmond, Pa., on the west shore, and from Deep Water Point to Camden, N. J., on the east shore.

The work other than as above outlined consisted in the medical supervision of detained aliens and the examination of warrant cases in this and other cities of this district.

MONTREAL, CANADA.

Surg. E. H. Mullan, in charge.

As in former years, the aliens are presented for examination at the Lagauchetiere Street office daily, except Sunday, from 9 to 5.

A certificate stating that the alien is free from disease or is afflicted with some malady is required in every case.

Aliens who can not be disposed of at a single examination, or whose condition requires consultation, are held for joint examination by the acting assistant surgeon and the medical officer in charge.

The Chinese are examined at the Windsor station, and those who are detained for further observation are sent to the Montreal General Hospital.

Cases of pediculosis were numerous during the winter months. All such cases were detained until free from this condition.

Since May 13, 1921, Chinese destined to Boston and New York have not been medically examined at this port, examination being limited to those in transit only.

A number of Chinese have been detained for further clinical and laboratory study, but no case of serious parasitic disease has been discovered.

NEW ORLEANS, LA.

Acting Asst. Surg. J. T. Scott reports as follows:

The restriction of immigration has reduced the arrival of immigrant aliens to the vanishing point. The nonimmigrant aliens continue to come as heretofore, and are represented by business men and their families from the Tropics, and a few students going to school in this locality.

There has been less than the usual number of foreign seamen taken from vessels and sent to the immigration station for further observation and treatment. Trachoma cases are fewer in number than heretofore. Venereal cases show considerable improvement, owing to the fact that the sailor realizes that he will be removed from the ship if he is infected with venereal diseases.

The immigration station is still handicapped by a lack of trained nurses, as well as by an incomplete supply of drugs and other necessary articles. Attention has been called to this deficiency repeatedly. The detained alien seaman has to commingle and eat in the same dining room with "deports," who are held pending deportation. Frequently the latter are of the criminal class. The claim is made that there is not sufficient funds available to build separate quarters or properly to segregate these classes.

The officers of the ships, as well as the agents ashore, cooperate with the medical officer to the fullest extent. As far as the Commissioner of Immigration and his aids are concerned, they are doing everything in their power to assist in the proper care of these detained cases. The matron, although not a trained nurse, is of great assistance and could not be dispensed with unless trained nurses be provided. The daily administration of arsphenamine is unusually risky on account of there being no trained nurses assigned to this station.

NEW YORK.

Surg. W. C. Billings, in charge, reports as follows:

During the fiscal year 1922, there were medically inspected at this station 282,220 alien passengers, of whom 16,189 were certified to the Commissioner of Immigration as presenting some mental or physical defect, and 413,526 alien seamen, of whom 278 were certified, making a total of 695,746 with 16,467 certificates. This fiscal year is the first under which the provisions of the so-called "3 per cent" law have been operative. The statement that these provisions are principally responsible for the smaller number of alien immigrants arriving at New York would probably be undisputed. During the fiscal year 1921 there passed through the medical division of the station 665,001 alien passengers, which means that the arrivals of the present year represent but 42.4 per cent of those of last year. This fact has enabled the medical division to examine "intensively" a larger percentage of arrivals than was previously possible. The value of "intensive" examination can not be overestimated, and effort should constantly be made to raise the proportion of those so examined. The number of aliens presenting themselves at Ellis Island with pediculosis has been markedly decreased, and the danger from typhus fever correspondingly diminished.

In general, the types of disease presented have not varied greatly from former years, nor is the deviation from the usual percentage of afflicted great enough to necessitate comment.

No marked change in administrative procedure has been inaugurated, as the well-tried routine methods have worked satisfactorily under the conditions which confront us. In the boarding section of the station, two medical officers have been stationed at quarantine, in order that the crews of nonpassenger-carrying ships might be inspected, from an immigration standpoint, at the same time as the quarantine examination was being made. The experiment is being continued in order that further observation may be made.

During 1922 the hospital section was operated, under interdepartmental agreement, as United States Marine Hospital No. 43, and in all matters connected therewith the hearty cooperation of the Immigration Service was always present and is here acknowledged with pleasure.

The table submitted herewith shows the amount of hospital work performed.

A new administrative problem has presented itself because of the inrush of aliens during the first half of the year and the very decided falling off in the number of arrivals during the latter half. This condition is occasioned by the very natural desire among the immigrants not to arrive after the quota from their respective countries has been filled. The medical staff at Ellis Island is highly trained and specialized, and, if disrupted, could not be rapidly reassembled. This means that while somewhat understaffed for the first half of the year, the station is somewhat overstaffed for the last six months; but because of the time required to attain the peculiar training necessary it can not be reduced.

Aid to the Immigration Service, other than that demanded by the law, in the nature of professional advice, medical treatment of employees becoming ill on duty, night inspection of detained immigrants,

etc., has been routine practice during the year, and the station has extended aid to merchant seamen, the Coast Guard, and the United States Employees' Compensation Commission.

The hospital buildings are still urgently in need of most of the repairs that have been repeatedly recommended.

Report of medical certificates relating to alien passengers.

Class A (1), including 37 insane, 32 moron, 3 idiocy, 23 imbecility, and 4 epilepsy, and 35 certified for tuberculosis.....	134
Class A (2), loathsome contagious disease, including 89 trachoma, 61 syphilis, 14 chancroid, 104 gonorrhea, 68 favus, 5 trichophytosis barbæ, 63 trichophytosis tonsurans, 86 trichophytosis of the ungium.....	490
Class B, diseases or defect which affects ability to earn a living.....	11, 278
Class C, diseases or defects of less degree.....	4, 887

Report of medical certificates relating to alien seamen.

Class A (1), including 2 insane, and 3 certified for tuberculosis.....	5
Class A (2), loathsome contagious disease, including 32 trachoma, 57 syphilis, 23 chancroids, 85 gonorrhea, and 1 trichophytosis barbæ.....	202
Class B, diseases or defects which affect ability to earn a living.....	31
Class C, diseases or defects of less degree.....	40

Disposition of immigrants certified.

Class A (1):	
Cases pending at beginning of year.....	29
Cases certified during year.....	134
Total to be accounted for.....	163
Cases deported.....	124
Cases landed.....	29
Cases pending close of year.....	10
Class A (2):	
Cases pending at beginning of year.....	218
Cases certified during year.....	490
Total to be accounted for.....	708
Cases deported.....	306
Cases landed.....	354
Cases pending close of year.....	48
Class B:	
Cases pending beginning of year.....	172
Cases certified during year.....	11, 278
Total to be accounted for.....	11, 450
Cases deported.....	475
Cases landed.....	10, 913
Cases pending close of year.....	62
Class C:	
Cases pending at beginning of year.....	39
Cases certified during year.....	4, 887
Total to be accounted for.....	4, 926
Cases deported.....	110
Cases landed.....	4, 798
Cases pending close of year.....	18

Race of aliens certified for mental condition during fiscal year ended June 30, 1922.

Race.	Insane.	Feeble-minded.	Idiocy.	Imbecile.	Epilepsy.	Total.
Belgian.....	1					1
African, black.....	2					2
Czechoslovakian.....	3	1				3
English.....	3				1	3
Finnish.....	3					3
French.....	1			1		2
German.....	2	1	1			4
Greek.....	1			1		2
Hebrew.....	4	18	1	12	1	36
Irish.....	6	3		1		10
Italian (south).....	2	3		7	1	12
Jugoslavia.....	1					1
Magyar.....		1				1
Panamanian.....			1			1
Polish.....	1				1	2
Russian.....	1					1
Scandinavian.....	5	2				7
Scotch.....		1				1
Welsh.....	1					1
Italian (north).....				1		1
Portuguese.....	1					1
Total.....	37	30	3	23	4	97

Nativity and race of immigrants certified for trachoma during fiscal year ended June 30, 1922.

Nativity.	Armenian.	Assyrian.	Chinese.	English.	German.	Hebrew.	Irish.	Lithuanian.	Magyar.	North.	Polish.	Rumanian.	Scotch.	South.	Slovak.	Spanish.	Total.
Armenia.....	6																6
China.....			7														7
Czechoslovakia.....				1		1									1		1
England.....					5												5
Germany.....									1								1
Hungary.....							2										2
Ireland.....								2		1				27			28
Italy.....						2											2
Lithuania.....						3		2									5
Poland.....						2					2						4
Rumania.....						2						2					4
Russia.....						14											14
Scotland.....													1				1
Spain.....																1	1
Turkey.....	5	1															6
Yugoslavia.....															2		2
Total.....	11	1	7	1	5	22	2	2	1	1	2	2	1	27	3	1	89

Races of immigrants deported on medical certificates during fiscal year ended June 30, 1922.

Race.	Men.	Women.	Children.		Total.
			Male.	Female.	
African, black.....	20	14	0	3	37
Albanian.....	1	0	0	0	1
Arabian.....	0	0	0	1	1
Armenian.....	11	7	1	2	21
Assyrian.....	0	0	1	0	1
Austrian.....	5	2	0	0	7
Bulgarian.....	2	1	0	0	3
Chilean.....	1	0	0	0	1
Chinese.....	3	0	1	0	4
Cuban.....	6	0	0	0	6
Czecho-Slovak.....	34	9	1	4	48
Dutch.....	4	0	0	0	4
English.....	29	7	2	1	39

Races of immigrants deported on medical certificates during fiscal year ended June 30, 1922—
Continued.

Race.	Men.	Women.	Children.		Total.
			Male.	Female.	
Finnish.....	2	3	0	1	6
Flemish.....	2	0	0	0	2
French.....	4	2	0	0	6
German.....	49	21	2	1	73
Greek.....	21	10	4	1	36
Hebrew.....	77	48	38	24	187
Irish.....	12	14	3	3	32
Italian (North).....	1	1	1	0	3
Italian (South).....	219	38	27	14	298
Lithuanian.....	1	4	1	3	9
Magyar.....	18	6	4	0	28
Mexican.....	5	0	0	1	6
Polish.....	3	9	3	3	18
Portuguese.....	2	0	0	0	2
Rumanian.....	7	3	1	2	13
Ruthenian.....	0	1	0	0	1
Russian.....	1	0	0	0	1
Scandinavian.....	27	8	1	0	36
Scotch.....	14	4	2	0	20
Serbian.....	1	0	0	0	1
Spanish.....	11	1	2	0	14
Spanish-American.....	5	0	0	0	5
Syrian.....	3	4	1	0	8
Swiss.....	3	1	1	1	6
Turkish.....	0	1	0	0	1
Welsh.....	2	1	0	0	3
Yugo-Slav.....	17	9	1	0	27
Total.....	623	229	98	65	1,015

Summary of hospital transactions.

Number of patients in hospital at the beginning of year.....	571
Number of patients admitted to hospital during year ³	9,762
Total treated (men, 3,606; women, 3,624; male children, 1,538; female children, 1,565).....	10,333
Births (male, 13; female, 8).....	21
Deaths (men, 22; women, 19; male children, 26; female children, 19).....	86
Pay patients treated during year.....	9,673
Free patients treated during year.....	660
Number of days treatment pay patients.....	120,097
Number of days treatment free patients.....	10,916
Total number of days treatment for hospital cases.....	131,013
Maximum number of patients in hospital at any time during year.....	595
Daily average number of patients in hospital.....	517
Number of patients in hospital at end of year.....	191

Hospital summary.

	From previous year.	Admitted.	Total treated.	Recovered.	Improved.	Not improved.	Died.	Remaining.	Total treatment (days).
Aliens.....	571	9,762	10,333	7,223	948	1,885	86	191	131,013
Beneficiaries.....	3	171	174	113	31	5	2	23	2,853

³ 174 beneficiaries not included in this statement.

NORFOLK, VA.

Acting Asst. Surg. Frank C. Makepeace, in charge, reports as follows:

During the fiscal year ended June 30, 1922, there were examined 36,087 seamen for the purpose of detecting disease and physical and mental defects, in accordance with the provision of the United States immigration laws.

The total number of alien seamen certified was 1,720. Of the seamen found defective, 12 were certified for tuberculosis, 1,147 as being afflicted with either loathsome contagious or dangerous contagious diseases (chiefly venereal diseases), and 562 for conditions which may affect ability to earn a living.

All alien seamen arriving at this port have been thoroughly examined for evidence of venereal disease, and all persons presenting suspicious lesions were brought to the station proper and the diagnosis was confirmed by the usual laboratory procedures.

There were 69 visits made to the county jail and other institutions, to examine or treat aliens under detention at those places awaiting deportation or other disposition.

SAN FRANCISCO, CALIF.

Surg. Dunlop Moore, in charge, reports as follows:

The duties devolving upon this station may be subdivided as follows: (1) Medical inspection of aliens; (2) hospital; (3) laboratory; and (4) miscellaneous.

MEDICAL INSPECTION OF ALIENS.

During the fiscal year, 13,543 alien passengers and 33,878 alien seamen were examined to determine the presence of physical or mental defects as required by the United States immigration laws. Primary examinations of seamen and cabin passengers, as a rule, are conducted on board ship in cooperation with the quarantine officers assigned to boarding duty. Generally, all primary examinations of alien passengers other than first cabin and all secondary examinations of passengers and members of crew are made at the Angel Island station.

The routine primary examination of alien steerage passengers at the Angel Island Hospital usually includes inspection of the stripped body, stethoscopic examination of the chest, eversion of the eyelids, a saltatory test for the detection of beriberi, and microscopic examination of the centrifugalized feces.

Certificates for physical and mental defects were issued as follows:

	Class A (1).	Class A (2).	Class B.	Class C.	Total.
Alien passengers.....	4	111	306	121	542
Alien crew.....	0	67	12	0	79
Total.....	4	178	318	121	621

Important causes of certification were the following: Uncinariasis, 287, and clonorchiasis, 158, both numbers in excess of those for 1921.

As compared with the preceding fiscal year ended June 30, 1921, the number of crew and passengers examined shows a marked decrease, and the number of certificates issued shows a very slight falling off. The decrease in the number of arriving passengers is largely attributable to restrictions placed upon Chinese immigration into Mexico and Cuba.

As in former years, Chinese and Japanese compose the bulk of the alien steerage passengers arriving at this port.

One hundred and fifty-eight reexaminations of aliens previously certified as afflicted with clonorchiasis were made at the request of the Commissioner of Immigration, and in each instance the certificate was reaffirmed. One hundred and sixty-four Chinese seamen desiring shore leave were specially examined, of which number 56 were certified as afflicted with clonorchiasis. These statistics may indicate a high rate of infestation among an unselected group of Chinese or an attempt to evade immigration restrictions by the familiar device of entering this country in the capacity of seamen.

HOSPITAL.

Hospital admissions during the year totaled 622. Important causes of admission with number of cases were: Uncinariasis, 228; mumps, 66; and scabies, 47. Only 10 cases of cerebrospinal fever were admitted, as compared with 31 cases during the previous year.

In addition to cases admitted to hospital, out-patient treatment for minor ailments was given to a total of 825 detained aliens and Government employees.

LABORATORY.

Laboratory work plays an important rôle in connection with the examination of aliens at this station. Five thousand and fifty-seven specimens of feces were examined for ova of intestinal parasites, in addition to the routine examinations of blood, sputum, urine, etc. Among the Chinese steerage immigrants, practically all of whom are natives of Kwangtung Province, intestinal parasitism is the rule. The more common parasites are, in the order of frequency, roundworm, whipworm, hookworm, and clonorchis. Quadruple infestations are by no means rare. The entire absence of infestations with *Taenia solium*, *T. saginata*, *Dibothriocephalus latus*, and *Hymenolepis nana* among arriving Chinese and Japanese is remarkable, in view of their respective pork and fish-eating propensities. Examination of a relatively small number of Persians (Assyrians) and Hindoos indicates that cestode infestations (including *H. nana*) are relatively common among these more western Asiatic races.

MISCELLANEOUS.

Medical opinions on various subjects have been submitted when requested by the commission. In this connection, 107 aliens were especially examined with a view to determining their approximate ages.

In connection with the treatment of uncinariasis, comparative studies of the therapeutic value of various anthelmintics, including carbon tetrachloride, indicate the superiority of our standard chenopodium-chloroform-castor oil treatment.

It is desired to acknowledge the courteous cooperation of the Commissioner of Immigration.

SEATTLE, WASH.

Surg. Hugh de Valin, in charge, reports as follows:

The practice of inspecting the crews of freighters at the Port Townsend quarantine station has been continued, also the inspection of first and second class passengers. Steerage passengers and crews of passenger vessels continue to be inspected at this port, usually on board the vessel.

A routine examination of the stools of all steerage passengers and all first arrivals of the second-class passengers is done to detect infestations with intestinal parasites. The principal parasitic ova found are those of *Ascaris lumbricoides* and of *Trichuris trichiura* for which the immigrant is not certified, and of *Ankylostoma duodenale* and of *Clonorchis sinensis*, which are certified. Hookworm disease is treated by the service in the immigration station, the following treatment being used:

Preparatory: 7 a. m., magnesium sulphate sat. sol., 60 c. c.; 7 p. m., sodium sulphate sat. sol., 90 c. c. Next morning, oil of chenopodium, three doses, of 15 drops each, in capsules, at 7, 9, and 11 a. m. At 1 p. m., chloroform, 2 c. c., and castor oil, 18 c. c., and at 1.30 p. m., castor oil, 30 c. c. The stools are examined six days later and the treatment is repeated if necessary. After the first treatment, three negative stools are required for release. After more than one treatment, only two. Ordinarily, two to five treatments are required.

In February examination was initiated for the ova of *Clonorchis sinensis*. Altogether 18 cases have been certified, 13 of whom were Chinese males, 1 Japanese male, and 4 Japanese females. The youngest case was 16 years of age, the oldest 57. Under authority from the Secretary of Labor, two cases have been given treatment here by private physicians. The first method tried was by intensive X-ray treatment. In one case this method was used for over a month; in the other about three weeks. The only apparent effect was a great increase in the number of clonorchis ova appearing in the stools. Antimony and potassium tartrate was given intravenously to one case, but the first few injections made the man so sick that he refused to take any more. Only about 3 grains altogether were given, without apparent effect. In both cases carbon tetrachloride has been given in doses of 6 c. c., thus far without apparent effect.

No facilities exist in the immigration detention quarters for isolation of cases of trachoma, scabies, or venereal diseases. A room large enough to accommodate at most six beds has been set aside in the women's quarters for hospital purposes, but thus far no equipment has been provided for it. In the men's quarters plans are under consideration for setting aside room for isolation.

The Commissioner of Immigration is desirous that the United States Public Health Service treat cases of trachoma and venereal diseases in the station, because it is thought that better control of the cases can be secured by having them in the station. If suitable isolation facilities and necessary material are provided by the Immigration Service, this proposal would probably be satisfactory. However, in view of the limited space in the present building, it is hardly thought possible that suitable isolation facilities can be provided. The provision of such facilities has been repeatedly recommended to the commissioner.

WINNIPEG, MANITOBA, CANADA.

Acting Asst. Surg. Harry J. Watson reports as follows:

Total number of aliens examined at this port during the fiscal year ended June 30, 1922, was 8,604.

Medical certification was given against aliens as follows:

Class A (1).....	41
Class A (2).....	19
Class B.....	1,032
Class C.....	27
Total.....	1,119

The number debarred by the United States Immigration Service was as follows:

Class A (1).....	41
Class A (2).....	19
Class B.....	33
Class C.....	3
Total.....	96

Two fires occurred at this office during the year. The second time, in January, 1922, it became necessary to move temporarily to other quarters. The present office has been entirely remodeled and is well equipped.

The number of aliens seeking admission shows a slight increase over that for 1921. The largest percentage of these have been in Canada for some years. Many of them have made considerable money and are changing their abode here to seek the climatic conditions which the Southern States offer. California has received many of the older people.

The number of medical cases seeking advice of the service representative is also very large. Cases of trachoma are few. Tuberculosis cases numbered only 17. These cases are growing fewer in number every year, owing to the fact that the sanatoria in Canada are accomplishing wonderful work in the treatment of the disease.

As the United States border is only 60 miles from Winnipeg, frequent attempts are made to cross the line without examination and the United States immigration authorities are kept busy in preventing the practice.

SANITARY REPORTS AND STATISTICS.

In charge of Asst. Surg. Gen. B. S. WARREN.

Health conditions throughout the country, so far as such conditions are shown by statistical data, were unusually favorable during the fiscal year ended June 30, 1922.

Reports to the Public Health Service indicated that a very mild form of influenza (*la grippe*) was prevalent in most sections of the country during February and March, 1922. In some localities increased prevalence was noted during the latter part of January.

The outbreak showed the usual characteristics of this disease, spreading through a community with surprising rapidity, and expending its force within a few weeks.

The disease was of so mild a nature that many cases were not reported, and it was not possible to secure even approximately accurate statistics of its prevalence. During the eight-week period from January 15 to March 11, 1922, inclusive, 24 States reported more than 103,000 cases of influenza. During the same weeks of the year 1921 these States reported less than 6,000 cases of this disease.

STATISTICAL OFFICE.

The statistical office has been under the charge of a statistician, with an advisory group of expert statisticians. The staff of the office consisted of three junior statisticians and a force of 10 to 15 statistical clerks, computers, operatives, and others. In addition to this personnel, there have either been detailed to or working in close cooperation with this office on statistical phases of various studies, assistant statisticians from the office of industrial hygiene and sanitation and the office of child hygiene, a junior statistician from the office of field investigations of pellagra, and a varying number of clerical workers from these offices. The statistical unit of the hospital division and the statistical work of the division of venereal diseases were placed under the supervision of the statistical office during the fiscal year. A central mechanical equipment for computing and tabulating operations is maintained.

The work of the office has been along two general lines: (1) In furnishing statistical assistance of a technical, clerical, and mechanical nature to other offices and divisions, and (2) in conducting certain statistical studies independently or in cooperation with various officers. The last named phases of the work of the statistical personnel are described briefly in the following paragraphs.

INDUSTRIAL MORBIDITY STATISTICS.

The work of developing standardized sickness records in industrial establishments as a foundation for the collection of a body of industrial morbidity statistics was advanced by correspondence

and through personal visits during the year to 20 large firms employing full-time physicians. It has been carried on in cooperation with the office of industrial hygiene and sanitation. The following summary shows the number of industrial establishments which on June 30, 1922, were actively cooperating with the service in the study of industrial morbidity:

Number of establishments and number of employees for which sickness records are kept for study in cooperation with the Public Health Service.

Minimum duration for recording disability.	Number of establishments.	Number of employees included.
One day.....	6	11,100
Five days.....	5	26,300
Seven days.....	24	68,600
Total.....	35	106,000

A special effort is being made to secure the records of sicknesses with a minimum duration of one day, and a group of interested establishments have expressed their willingness to cooperate through their medical departments. A special committee on such records was created by the American Association of Industrial Physicians and Surgeons at its annual meeting in St. Louis in May, 1922. These records will permit of analysis according to sex, age, nationality, season, occupation, and length of service. One large company has turned over to this office all of its detailed records for tabulation, the records having been previously transferred to cards for mechanical tabulation in accordance with suggestions from this office, and others have expressed their willingness to do so. The experience so far collected indicates that where records for illnesses of short duration (one day or less) are kept, the average frequency rate of disabling sickness is approximately two cases per person per year. The frequency of certain causes that would not appear to an appreciable extent in records of sicknesses of longer duration is illustrated in the following table for female wage earners:

Frequency of certain ailments causing absence from work among female workers for whom sickness records of short duration were kept.

Disease or condition.	Frequency rate— Cases per 1,000 persons.		Severity rate—Days per case.	
	Factory workers, 1920. ¹	Office employees, 1921. ²	Factory workers, 1920. ¹	Office employees, 1921. ³
Colds.....	256.5	339.3	3.31	1.47
Dysmenorrhea.....	151.4	233.2	2.58	1.61
Tonsillitis.....	238.8	36.7	6.29	4.29
Headache.....	98.4	183.3	3.20	1.05
Rheumatism.....	24.0	39.8	7.46	1.56

¹ Data for female employees in rubber factory and for illnesses lasting one day or longer.

² Data for office employees the great majority of whom were females and for absences due to illnesses lasting one hour or longer.

The collection of morbidity data from the records of two large employee sick-benefit associations in Chicago was completed during the year, and the work of coding, punching, tabulating, and analyzing the material is in progress. The study covers all cases of sickness and nonindustrial accidents causing disability for one week or longer among persons in one plant who were members of the association for 5 years or longer in the period from 1911 to 1920, and among *all* members in three other large plants during the five years ending with December 31, 1920. Disability is to be studied from the point of view of sex, age, and nationality; the seasonal variation in sickness incidence; the age distribution of persons ill from certain degenerative diseases; the increase or decrease in the frequency and severity of specific diseases in the 10 years from 1911 to 1920; and the chronology of cases among persons experiencing an excessive amount of disability.

Cooperation with sick-benefit organizations for the study of illnesses causing disability for five days or longer and with other sick-benefit associations for the study of cases lasting seven days or longer was continued, and the frequency of sickness lasting a week or longer in each month of 1920 and 1921 was found to be as follows:

Frequency of disabling sickness and nonindustrial accidents lasting one week or longer among sample groups of industrial employees, by months, in 1920 and 1921.

Month of onset in 1920.	Number of associations reporting.	Member-ship.	Annual number of cases per 1,000 persons.	Month of onset in 1921.	Number of associations reporting.	Member-ship.	Annual number of cases per 1,000 persons.
January.....	8	14,208	275.0	January.....	29	67,028	134.0
February.....	13	22,249	326.7	February.....	30	68,820	152.5
March.....	15	23,527	126.0	March.....	30	72,755	128.5
April.....	17	25,832	103.9	April.....	31	71,503	110.6
May.....	22	54,044	76.7	May.....	31	70,555	88.4
June.....	25	58,036	67.3	June.....	31	69,389	76.6
July.....	26	58,885	67.1	July.....	22	56,331	70.6
August.....	25	58,969	60.1	August.....	22	55,577	57.9
September.....	23	60,264	56.2	September.....	22	55,566	56.7
October.....	25	59,211	76.4	October.....	22	56,272	81.6
November.....	27	75,045	85.7	November.....	22	56,925	94.3
December.....	26	67,197	106.1	December.....	22	56,511	105.2

FIELD STUDY OF MORBIDITY.

A field study of the incidence and prevalence of morbidity in an observed population was begun in November, 1921. It is believed that this is the first time a continuous study of this kind has been made for a typical population. A sufficient personnel was detailed to make a preliminary canvass of approximately 2,200 households, with a population between 8,000 and 9,000 individuals, about one-third of the total population of the city. In the course of this canvass the name, address, color (or race), sex, and age of each individual was ascertained, as well as data relating to employment, prior attacks of typhoid fever, scarlet fever, measles, diphtheria, smallpox, and whooping cough, specific immunization for typhoid, diphtheria, and smallpox, and incidence of ill health at the date of canvass. For each household data were obtained as to residence, size and sanitary condition of dwelling, crowding, method of excreta disposal, source of drinking-water supply, source of milk supply, and economic

status. Since the first canvass three field assistants have been detailed for the continuous observation of the households for the incidence of sickness and it is believed that a fairly accurate and complete record has been developed. This work has had the hearty cooperation of the local medical profession in furnishing diagnoses for all cases attended by physicians, and has had the assistance of the nurses and the clinics connected with the county health demonstration. In addition, the teachers in the public schools have furnished regularly a weekly list of children who have been absent from school on account of sickness. It is purposed to continue this series of observations for as long a period as practicable, greater attention being given to the incidence of cases of short duration and to chronic cases.

STATISTICAL STUDIES IN MORTALITY FROM PULMONARY TUBERCULOSIS.

An analysis was begun of mortality data for several important causes that had been compiled during the previous year from unpublished tabulation sheets supplied from the Bureau of the Census and from the records of the New York City health department, especial attention being given to the data for pulmonary tuberculosis. The collection of the material and the computation of specific (age) rates for either sex for various geographical areas and population groups have been practically completed, and some of the further statistical work, such as correlation of deaths from various causes and the study of time variables, has been begun. The work has been carried along the following lines:

(a) *Trend of tuberculosis mortality in recent years.*—The rapid decline in the mortality from pulmonary tuberculosis since 1917 has been very striking, but it is not possible to ascertain the significance of the decline without considering the previous period as a background. Such a study was therefore made, and a paper involving the results has been completed.

(b) *Relation to influenza epidemic.*—There is considerable literature on this point, but mostly of a clinical nature. In this study it was ascertained that there was a marked increase in the recorded mortality from pulmonary tuberculosis coincident with each wave of the influenza epidemic, that this excess mortality from pulmonary tuberculosis had a strikingly different age distribution from the normal (the incidence being much greater in the young adult ages), and that there was a much higher proportion of whites affected than is usually the case.

(c) *Changes in age distribution of pulmonary tuberculosis mortality.*—The Massachusetts records from 1860 to 1921 have been compiled and analyzed from the point of view of specific (age) death rates.

(d) *Correlations of mortality from pulmonary tuberculosis with that from certain other causes.*—It was pointed out in the last annual report that mortality rates from certain causes according to age, sex, State, and year had been obtained by courtesy of the Census Bureau for the purpose, among others, of correlating the different causes of death at specific ages. These correlations were commenced during the past year, special attention being given to pulmonary tuberculosis.

(e) *Specific death rates among persons of different sexes.*—When compared for States, it was found that the age curve for females was

generally similar but that the curve for males was widely variable. Upon further analysis according to urban and rural condition, however, it was found that the variation was confined chiefly to urban males after the age of 30, the curves for females, both urban and rural, and for rural males being generally similar in their type and height.

STUDIES IN STATISTICAL TECHNIQUE.

As mentioned in the previous report, in connection with various studies which have been made by the statistical office independently or in cooperation with other offices, it has been found necessary to make certain applications of statistical methods to vital statistics and health problems which heretofore had not been fully developed.

In the analysis of vital statistics of an historical character it is frequently necessary to eliminate the effect of a number of disturbing factors which may not be under study at the time, but the effect of which prevents definite conclusions from being reached. Among these variables may be mentioned: Secular trend, cycles, short-time fluctuations, and chance variation. For instance, it is not possible to gain a precise conception of the epidemic peaks of influenza without first eliminating from the mortality rates the effect of these factors. Problems of this type recur so frequently in the work of the office that a special study was devoted to the question. General methods which could be modified to meet special conditions were evolved, based in part on methods employed in economic and other fields. A paper embodying the results of an attempt to eliminate the effect of statistical variables such as these will be submitted for publication. In the meantime the methods developed are being used continually in the work of the office.

Among other studies in statistical technique which have been made are the application of the theory of probability in a number of ways to vital statistics, the method of partial correlation, the use of mathematically calculated curves by the methods of moments and of least squares, and application of Fourier's equation to determine periodic tendencies.

STATISTICAL STUDIES IN COOPERATION WITH OTHER OFFICES AND DIVISIONS.

1. *Child hygiene*.—These studies have been carried on in cooperation with field investigations of child hygiene. The tabulation and analysis of a considerable amount of field data was completed, and certain statistical studies along especial lines were made as summarized.

A statistical analysis was made of data from a study of the growth of school children before and after the correction of certain physical defects. Weight records were tabulated for children with adenoids or defective tonsils before and after tonsillectomy. The children were found to increase in weight much faster after the correction of the defect.

A study was also made of the relation of physical defects in children to absence from school on account of sickness. The data consisted of physical examinations of 3,786 children, together with the

records of school attendance for the session 1920-21. The children with defects were found to lose more time from school on account of sickness than those with no defects; those with more serious defects lost more time than those with less serious defects.

A study partly completed last year on the heights and weights of 14,335 children from the Southeastern States was completed and published. In addition to the determination of various constants, tables were constructed to show the smoothed average weights by sex, age, and height for children of native white parentage and, it is believed, the data are sufficiently representative to serve as a standard table of height and weight for native white children in that section.

2. *Statistical and epidemiological studies of influenza.*—The past year brought to a completion the cooperative arrangement between the Public Health Service and the influenza commission of the Metropolitan Life Insurance Co. for the statistical and epidemiological study of influenza. An extensive monograph and a few short papers embodying the results of this investigation are in the process of final preparation. These reports will deal with the records of special surveys made in a number of localities during the winter of 1918-19, and an additional survey in Baltimore in 1920, morbidity reports from Kansas and Maryland, detailed records of the monthly mortality from influenza-pneumonia in the registration area since 1910, and in certain areas for a much longer period, and records showing the course of mortality in foreign countries during the 1918 epidemic. At the present time, such studies as are possible are being continued as a part of the current work of the statistical office.

3. *Venereal diseases.*—With personnel detailed to this office from the division of venereal diseases, the current tabulation of clinic reports and reports from State health departments is being done in the statistical office. In addition, the tabulation of between 8,000 and 9,000 case reports of venereal diseases in Louisiana, Mississippi, Arkansas, and Georgia was completed. The results of these tabulations combine in a general way the results previously obtained from a study of the case reports in cantonment zones and Indiana with respect to the age incidence of gonorrhea and syphilis among individuals of different sex. In an effort to ascertain how much agreement in opinion and experience exists among pathologists and syphilographers as to the importance of syphilis as a cause of death, a large number of questionnaires were tabulated. The results were unsatisfactory so far as helping to arrive at any dependable estimate, but were of value in indicating plainly the extraordinary differences of opinion and the paucity of statistical data.

4. *Pellagra.*—Assistance was rendered from time to time in the statistical phases of the pellagra studies. The statistical analysis of the material previously collected in the field is carried on under the statistical office.

5. *Industrial hygiene.*—In cooperation with the office of industrial hygiene and sanitation, the studies in industrial morbidity to which reference already has been made were continued and developed, and technical assistance from time to time was rendered to the staff of the industrial hygiene office.

6. *Hospital division.*—The immediate direction of the work of the statistical unit of the hospital division was placed under the statistical office in May, 1922.

MISCELLANEOUS.

Upon request various members of the staff have furnished technical advice and assistance to various bureaus of vital statistics and to epidemiologists in State and local health departments. The statistician in charge has served as a member of the committee on weight and height measurements of children and of the advisory statistical committee of the National Child Health Council and a committee on industrial sickness records of the American Association of Industrial Physicians and Surgeons. A number of reports and articles of a statistical nature which were submitted for publication in the Public Health Reports or as Public Health Service Bulletins have been critically reviewed. Papers were read on "Morbidity studies" before the vital statistics section and on "Industrial morbidity records" before the industrial hygiene section of the American Public Health Association at New York in October, 1921; on "Specific death rates for pulmonary tuberculosis" before the American Statistical Association at Pittsburgh, December, 1921; and on "Sickness records in preventive work" before the American Association of Industrial Physicians and Surgeons at St. Louis, May, 1922.

Ten publications of a statistical nature were prepared wholly or in part in the statistical office during the year.

COLLABORATING AND ASSISTANT COLLABORATING EPIDEMIOLOGISTS.

The system of collecting morbidity reports by appointing representatives of the Public Health Service in State and local health departments was continued and extended during the fiscal year.

These representatives are officers of the health departments of the State, city, or county.

Their duties are to secure information of the presence of dangerous communicable diseases and to notify the Public Health Service at once upon the appearance of outbreaks in order that measures may be taken to prevent the interstate spread of the diseases. The representatives also collect and forward data regarding the prevalence and geographic distribution of communicable diseases for statistical use.

The information collected by representatives located in city and county health departments is forwarded through the State health department, and is available for use by local and State health departments.

Collaborating epidemiologists have been appointed for 41 States. The State health departments of five States—Indiana, North Dakota, South Dakota, Tennessee, and Wyoming—were added to the list during the present year. The results of the work of these representatives has been apparent in better reporting of cases of disease, and reports are being received from a constantly increasing number of communities, although there is yet much room for improvement in the accuracy and completeness of the reporting of diseases.

The table following shows the increase in the number of representatives of the Public Health Service in State and local health departments from 1918 to June 30, 1922.

State.	Collaborating epidemiologists.					Assistant collaborating epidemiologists.				
	1918	1919	1920	1921	1922	1918	1919	1920	1921	1922
Alabama.....	1	1	1	1	1	8	8	67	68	72
Arizona.....				1	1				14	14
Arkansas.....	1	1	1	1	1			218	227	213
California.....			1	1	1			290	295	303
Colorado.....				1	1				179	208
Connecticut.....	1	1	1	1	1					
Delaware.....		1	1	1	1					
Florida.....			1	1	1			1	3	4
Georgia.....	1	1	1	1	1	4	11	20	23	24
Idaho.....				1	1					
Illinois.....	1	1	1	1	1			101	101	103
Indiana.....					1			543	543	539
Iowa.....	1	1	1	1	1					
Kansas.....	1	1	1	1	1		109	113	115	116
Kentucky.....	1	1	1	1	1		36	133	134	131
Louisiana.....	1	1	1	1	1				2	6
Maine.....			1	1	1			7	471	474
Maryland.....	1	1	1	1	1		83	82	82	78
Massachusetts.....	1	1	1	1	1			209	356	352
Michigan.....			1	1	1			5	4	4
Minnesota.....	1	1	1	1	1			1	1	1
Mississippi.....	1	1	1	1	1			22	42	83
Missouri.....	1	1	1	1	1			99	119	119
Montana.....	1	1	1	1	1					
Nebraska.....			1	1	1			95	95	95
New Jersey.....	1	1	1	1	1					
New Mexico.....								66	66	32
North Carolina.....	1	1	1	1	1	93	106	107	108	105
North Dakota.....					1					
Ohio.....	1	1	1	1	1			145	145	157
Oklahoma.....	1	1	1	1	1			1	1	1
Oregon.....				1	1				120	120
South Carolina.....	1	1	1	1	1					
South Dakota.....					1					63
Tennessee.....					1					2
Texas.....			1	1	1			198	198	302
Vermont.....	1	1	1	1	1		10	10	10	10
Virginia.....	1	1	1	1	1				15	13
Washington.....	1	1	1	1	1		19	20	20	20
West Virginia.....		1	1	1	1		77	106	106	106
Wisconsin.....			1	1	1			144	199	226
Wyoming.....					1					24
Total.....	23	26	32	36	41	105	459	2,803	3,862	4,125

REGISTRATION AREA FOR MORBIDITY REPORTS.

Morbidity reports in the United States as a whole are not satisfactory. They are incomplete, vary greatly in different States and even in different parts of the same State, and often it is found that data which are essential to an understanding of health conditions are not available.

Knowledge of the prevalence and geographic distribution of communicable diseases is essential to enable health departments, local, State, and Federal, to perform their duty of safeguarding the public health. The Public Health Service needs prompt and accurate information of the prevalence of communicable diseases to enable it to prevent the introduction of disease into the country, to prevent its interstate spread, and to enable the Federal Government to comply with international obligations to give notice to other Governments of the prevalence of quarantinable diseases.

To encourage the reporting of cases, to secure reasonably accurate and comparable reports, and to insure the prompt forwarding of these reports to the Public Health Service, a registration area for morbidity reports should be established. It is proposed to extend the present system of collaborating and assistant collaborating epi-

demologists, employed at nominal salaries, in State and local health departments, and to employ a statistical clerk in each State which is included in the area for the purpose of securing the reports of cases and forwarding the needed information to the Public Health Service.

This plan will enable the Public Health Service (1) to secure information of outbreaks and of unusual prevalence of disease before it becomes widespread and its control in interstate traffic is impossible; (2) to secure reports of endemic and epidemic diseases which are comparable with similar reports from other communities or States; and (3) to insure that the reports will be accurately transcribed and promptly forwarded, by telegraph or mail, to the Public Health Service.

The conference of State and Territorial health officers with the United States Public Health Service, held pursuant to the provisions of section 7 of the act of July 1, 1902 (32 Stat. L. 712), has more than once urged the establishment of a registration area for morbidity reports.

STATE MORBIDITY REPORTS.

WEEKLY TELEGRAPHIC REPORTS.

Telegraphic reports of the prevalence of communicable diseases were received from State health officers each week. These reports were tabulated and published weekly in Public Health Reports. During the fiscal year 35 State health departments cooperated by sending these telegraphic reports. Coming promptly, and supplemented by special reports of unusual conditions, they furnish a valuable current index of the prevalence of communicable diseases throughout the country.

These reports were received from the following-named States:

Alabama.	Kansas.	New Mexico.
Arkansas.	Kentucky.	New York.
California.	Louisiana.	North Carolina.
Colorado.	Maine.	Oregon.
Connecticut.	Maryland.	South Dakota.
Delaware.	Massachusetts.	Texas.
District of Columbia.	Minnesota.	Vermont.
Florida.	Mississippi.	Virginia.
Georgia.	Missouri.	Washington.
Illinois.	Montana.	West Virginia.
Indiana.	Nebraska.	Wisconsin.
Iowa.	New Jersey.	Wyoming.

MONTHLY REPORTS.

More comprehensive reports were received monthly by mail from the State health departments of 40 States, the District of Columbia, and Hawaii. These reports give the number of cases of certain notifiable diseases by counties and other political subdivisions in the States. A summary of the reports is published in Public Health Reports immediately. The details are given in tabulations which are compiled quarterly.

The following table shows the States reporting:

Alabama.	Connecticut.	Idaho.
Arizona.	Delaware.	Illinois.
Arkansas.	District of Columbia.	Indiana.
California.	Florida.	Iowa.
Colorado.	Hawaii.	Kansas.

Louisiana.	New Jersey.	Rhode Island.
Maine.	New Mexico.	South Carolina.
Maryland.	New York.	South Dakota.
Massachusetts.	North Carolina.	Vermont.
Michigan.	North Dakota.	Virginia.
Minnesota.	Ohio.	Washington.
Mississippi.	Oklahoma.	West Virginia.
Montana.	Oregon.	Wisconsin.
Nebraska.	Pennsylvania.	Wyoming.

ANNUAL REPORTS.

Summaries are received from State health departments annually, giving by months the number of cases of communicable diseases reported and the number of deaths from these diseases. These data are tabulated and arranged for ready comparison with the average of similar reports for previous years.

Case rates, death rates, and fatality rates are computed, and the compilations are published in Public Health Reports and later reprinted as separates for economical distribution.

CITY REPORTS.

Weekly mail reports were received from 555 cities, giving the number of cases of each of the principal notifiable diseases reported to the city health authorities during the preceding week and the number of deaths from these diseases. The number of cities reporting increased more than 6 per cent during the year.

These reports reflect urban health conditions only, but many of the cities have efficient health departments and are able to secure more nearly complete reports of cases of disease than is possible in most rural communities.

Annual summaries of the number of cases of communicable diseases reported and deaths from these diseases during the calendar year 1921 in cities having more than 10,000 population were published. Comparisons were made with the median number of cases reported by the same cities during preceding years, and case rates per 1,000 population, death rates, and fatality rates were calculated for each city. These summaries were reprinted in two volumes, the first giving statistics for all cities in the United States having over 100,000 population, and the second including 492 cities of from 10,000 to 100,000 population.

FOREIGN REPORTS.

Reports of the prevalence of cholera, plague, smallpox, typhus fever, yellow fever, and other diseases were received during the fiscal year from officers of the Public Health Service stationed abroad, from American consular officers (under the provisions of the act of February 15, 1893), and from foreign governments.

The information contained in these reports is published in the Public Health Reports for the information of quarantine officers and others concerned.

SANITARY LEGISLATION.

During the fiscal year a volume of State laws and regulations pertaining to public health was prepared. This volume contains meas-

ures adopted during the calendar year 1919. The series to which this volume belongs contains public health enactments of the States from July 1, 1911, to December 31, 1919.

A similar series of volumes contains municipal ordinances and regulations adopted in cities of the United States during the 10-year period 1910 to 1919, inclusive.

The published reports of judicial decisions were examined, and opinions which were of especial interest to public health workers were abstracted and published.

A compilation of laws pertaining directly to the Public Health Service was made and was ready for the printer at the close of the fiscal year.

PUBLICATION OF SANITARY DATA.

The Public Health Reports was issued weekly during the fiscal year. It contained 3,352 pages exclusive of indexes, an increase of more than 7 per cent over the number for the preceding year. Ninety-five articles were reprinted for economical distribution.

PREVALENCE OF DISEASE.

The following table shows the number of cases of a few of the more important communicable diseases reported by State health officers for the calendar year 1921, compared with the median¹ number of cases reported for the years 1913 to 1920, inclusive. Case rates per 100,000 population are also given.

Disease.	Number of States included.	Number of cases.		Cases per 100,000 population.	
		Median of previous years.	1921	Median.	1921
Cerebrospinal meningitis.....	33	2,425	2,083	3.2	2.6
Diphtheria.....	45	117,210	197,934	127	203
Measles.....	45	350,172	254,551	377	261
Poliomyelitis.....	39	2,239	6,182	2.8	7.3
Scarlet fever.....	45	106,386	184,141	115	189
Smallpox.....	42	52,655	92,378	58	96
Typhoid fever.....	44	52,495	42,989	58	45

Cerebrospinal meningitis showed a decrease of 18 per cent in the rate per 100,000 population in 1921 as compared with the median for preceding years.

Diphtheria was unusually prevalent in 1921, the number of cases reported being 69 per cent higher than the median, and the rate 60 per cent higher.

Reports from 45 States indicated a decrease of 27 per cent in the number of cases of measles and 31 per cent in the rate.

A decided increase in the number of cases of poliomyelitis (infantile paralysis) in the summer and fall of 1921, which was especially notice-

¹ The median has been defined as the magnitude of the middle item in an array. If the numbers of cases reported are arranged so that the greatest number reported in any one year is first, the second greatest number is second, and so on, then the number of cases in the center of the array is the median. The following illustration shows the method followed when data for five years are available: In a State reporting 60 cases in 1915, 79 cases in 1916, 71 cases in 1917, 58 cases in 1918, and 53 cases in 1919, the median is 60 cases. When data for certain States were not available for the full eight-year period, as many years as possible from 1913 to 1920, inclusive, were used in ascertaining the median.

able in the Northern States, raised the rate for this disease 161 per cent above the median.

The scarlet fever rate was 64 per cent higher than the median.

The number of cases of smallpox was more than 75 per cent greater than the median in 42 States combined, and the rate was 65 per cent higher.

Both case and death rates for typhoid fever have been decreasing for many years. The death rate in the registration area for deaths decreased from 35.9 per 100,000 population in 1900 to 7.8 per 100,000 in 1920. This tendency is shown in the table. Forty-four States reported figures which gave an aggregate reduction of 18 per cent in number of cases and 22 per cent in the rate for 1921 as compared with the medians for recent years. This showing for typhoid fever indicates what can be accomplished in the prevention of sickness and saving of lives by public health work, and it is in marked contrast with the increase in diphtheria and smallpox, for both of which diseases the means of control are well known.

SECTION OF PUBLIC HEALTH EDUCATION.

During the fiscal year ended June 30, 1922, 116 new publications were issued, compared with 120 during the preceding year. The total number of copies of these publications and of reprints of previous documents distributed aggregated 949,460, as compared with 859,808 copies during the preceding fiscal year. The 949,460 leaflets sent in response to 48,624 public requests does not include the publications printed and distributed by the division of venereal diseases.

During the fiscal year 33 issues of mimeographed bulletins were prepared and issued by the Public Health Service to newspapers, publishing agencies, and individuals. These dealt largely with the results of studies and investigations made by the Public Health Service.

The section received 96 requests for stereopticon slides, and in response to these requests loaned 7,200 slides. The work of the stereopticon library has been greatly hampered, owing to the shortage of slides and to the lack of funds for making new slides.

The section has received many requests for the loan of exhibit material, posters, and motion pictures, but compliance with most of these has been impossible because of the lack of funds.

DIVISION OF MARINE HOSPITALS AND RELIEF.

In charge of Asst. Surg. Gen. C. H. LAVINDER.

The increased activities of this division occasioned by its responsibility in furnishing medical care and treatment to veterans of the World War terminated during the year by the transfer to the newly created United States Veterans' Bureau of both the dispensary and hospital systems organized for this work. It will be recalled that the administrative organization of district supervisors was transferred last year. With these changes, therefore, this division no longer sustains any relationship to the medical care and treatment of veterans with the exception that the marine hospitals are still open for the admission of such veterans for treatment as the Director of the United States Veterans' Bureau may care to have admitted therein. At the close of the year there still remain under treatment in marine hospitals several hundred veterans, and doubtless a certain number will be cared for in these hospitals for some time to come.

The transfer of these agencies and these activities to the United States Veterans' Bureau (which replaced the War Risk Insurance Bureau) was done in accord with a general policy established by the Congress in the passage of legislation known as the Sweet Act (approved August 9, 1921). This legislation, as was indicated in my report of last year, was the result of much dissatisfaction at the existing administrative organization involved in furnishing care to ex-service men and women. It created for this purpose a bureau under the President, known as the United States Veterans' Bureau, which bureau is charged with full authority and full responsibility for all activities relating to ex-service men and women. Evidently it was the intention of Congress to place in one organization and under one individual all responsibility connected with this highly important matter.

This act provided that under Executive order certain hospitals operated by the Public Health Service could be transferred to the United States Veterans' Bureau for future management, control, and operation. The President, in accord with this legislation and upon the recommendation of the Federal Board of Hospitalization, the Director of the United States Veterans' Bureau, and myself, signed an Executive order, effective May 1, 1922, transferring to the United States Veterans' Bureau all of the veterans' hospitals operated by this division, leaving the Public Health Service in the future to operate only marine hospitals.

The transfer of the hospital system was the last step in the severance of the Public Health Service from the large responsibility which it has carried for three years in connection with the medical care and treatment of veterans of the World War.

It is worthy of note that the transfer both of the system of outpatient dispensaries and of the large system of hospitals from one

bureau to another, was effected without any interruption to the service being given to veterans.

The transfer of dispensaries was of far less significance than the transfer of the hospitals, because, as noted in my last report, this transfer had already been begun in the transfer of the district supervisors' organization. As I took pains to point out at that time, the dispensary system and the district supervisors' organization were so closely connected in many regards as to require the transfer of a considerable portion of the out-patient facilities with the district supervisors' organization, leaving, therefore, only a part of the dispensary organization to be carried over in the final transfer.

As a matter of fact the transfer of the district supervisors' organization, with the transfer of the dispensary system involved, caused both bureaus considerable embarrassment, and it was a relief from a rather unpleasant situation when the dispensary system was finally transferred completely. The attempt, after the transfer of the district supervisors' organization, to operate a dispensary system under this division for the care of ex-service men and women proved to be not a feasible arrangement. This is quite evident from the comments which were made in my last annual report concerning this matter.

It may be mentioned as of interest that in the transfer of the hospital system this division turned over to the Veterans' Bureau 57 hospitals, of which 44 were operating at the time of the transfer. These hospitals in round numbers had a total bed capacity of 17,500 and contained about 13,000 patients. The operating personnel numbered over 900 doctors, dentists, and attending specialists, about 1,400 nurses, who with other classes of employees made a grand total of about 11,500 persons.

The headquarters of this organization was transferred immediately to the Veterans' Bureau, in Washington, the Public Health Service withdrawing therefrom only a few persons. Care was taken to see that the efficiency of this administrative unit was not impaired in the process, and it still continues to function in the Veterans' Bureau along the same general lines as laid down by the hospital division.

STATUS AT CLOSE OF FISCAL YEAR.

This division was, therefore, left on May 1, 1922, charged with the same responsibilities which it had carried previous to the assumption of the larger responsibilities mentioned above.

The transfer left this service in control of 24 operating marine hospitals, with a total bed capacity of over 3,000 beds. The increase in bed capacity of these hospitals during this time is due mainly to the fact that this service, with the entire consent of the immigration authorities, and under law, has taken over the complete operation of the hospitals at the immigration station at Ellis Island, N. Y., and has added to its system of hospitals a new marine hospital at Norfolk, Va., and a new marine hospital in Greater New York, located on Hudson Street in lower Manhattan, and has also acquired a national leprosarium at Carville, La., which is operated as a marine hospital. Moreover, there has been some slight increase in the number of beds at a few marine hospitals by temporary additions.

Some difficulties were encountered with regard to the transfer of the personnel involved in the large organization. The commissioned personnel were transferred by detail, as provided by law, and all other personnel were transferred permanently to the pay rolls of the Veterans' Bureau. Provision was made for the withdrawal of the Regular commissioned officers, but the medical officers of the Reserve were to remain on detail with the Veterans' Bureau as long as their services were desired by that bureau. The details of this matter will be discussed in the report of the division of personnel and accounts. Some Reserve officers are still left on duty, under this division, in field stations.

All properties acquired by the Public Health Service to be used in the medical care and treatment of ex-service men and women were transferred to the Veterans' Bureau by the Executive order. Certain supplies of considerable value which had been transferred to the Public Health Service by other governmental departments, in accordance with law, and which were stored in the two depots, Perryville, Md., and North Chicago, Ill., have been the subject of negotiations with the respect of an early settlement upon an equitable basis which will probably be satisfactory to all parties involved.

This situation has been somewhat confused by plans to create in the department a new bureau of supply, but as soon as this new bureau is formed and has taken over the functions it is expected to discharge, with the completion of the necessary adjustments with the other bureaus of the department, there is no obvious reason why the entire matter can not be satisfactorily arranged.

The situation of the hospital division at the close of the fiscal year is, from an administrative standpoint, satisfactory, in spite of the fact that there are still left a great many matters for adjustment with the Veterans' Bureau. Many of these matters are of importance, but they are receiving attention and doubtless within the next few months they can all be satisfactorily settled.

The adjustment of so many matters of this kind has, of necessity, thrown upon the administrative personnel in the headquarters of the hospital division an undue amount of work which prevents for the time anticipated reductions in personnel. It is hoped that when all of these matters are adjusted that the hospital division may be able to function with a personnel somewhat reduced over that now employed.

COOPERATIVE RELATIONSHIPS.

Satisfactory cooperation has been maintained with the Veterans' Bureau and with the American Red Cross and other agencies interested in the welfare of the disabled ex-service man.

The transfer of hospitals to the Veterans' Bureau has interrupted certain services carried on in the marine hospitals, especially medical social service activities which have been conducted under the American Red Cross. This organization still maintains its workers in those of the marine hospitals who are caring for veterans, but is withdrawing from our other hospitals. It is a matter of much concern to devise some means of carrying on these activities. They are regarded as highly important, but funds do not permit of the

employment of the necessary personnel. It is hoped that some sort of arrangement may be made which will give at least a fair degree of satisfaction.

Similar remarks might be made concerning the hospital library service, which was instituted and for a time carried on in the hospitals of this service by the American Library Association. It is an excellent service and should not be discontinued. It is hoped that satisfactory arrangements may be made with the local public libraries whereby at least a modified form of hospital library service could be continued with satisfaction.

By the issuance of a circular by the Director of the Budget, on November 1, 1921, there was created a body known as the Federal Board of Hospitalization. This board has operated under a chief coordinator and is composed of the heads of those departments interested in the hospitalization of veterans of the World War. This board acts as an advisory and coordinating agency in the hospitalization of veterans of the World War. Its sessions have been numerous, interesting, and profitable, and it has been of material assistance on many occasions in the discharge of responsibilities relating to the medical care of disabled veterans.

Under the auspices of this board during the year there were called together in Washington the medical officers in charge of all Federal hospitals engaged in furnishing medical care and treatment to veterans. This included hospitals of the Army, Navy, National Homes for Disabled Volunteer Soldiers, Public Health Service, and St. Elizabeths Hospital of the Interior Department.

This group of officers spent several days in Washington discussing various features of hospitalization of veterans and the development of a better program. They were addressed by a number of prominent officers of the Government on various subjects. This meeting did much to improve the morale of the service and the efficiency of the hospitalizing agencies concerned.

CENTRAL OFFICE AND FIELD ACTIVITIES.

Both the central office and the field activities of the hospital division, up to the time of the transfer of the hospitals to the Veterans' Bureau, continued to operate under the same general organization as previously. Subsequent to this transfer many radical changes became necessary and these are still in process of accomplishment.

The organization which was formed for the conduct of the veterans' work both in Washington and in the field underwent during the year many minor changes, all in the nature of improving the organization, and at the time of the transfer it is believed that this organization was functioning at its best. Time and experience had given opportunity to improve the efficiency of the organization and advantage was taken of the opportunity of doing so wherever possible.

The transfer of the hospitals, of course, greatly reduced the operating personnel in the central office as well as in the field. As stated above, the changes in the central office are not complete, and as soon as adjustments are made on the new basis further reductions may be made. The readjustments in the field organization, so far as hospitals were concerned, are inconsequential. A lesser number of hospitals were left to operate, and these have continued to operate under the same general policies as previously obtained.

The readjustments with regard to other field activities, however, were much more important and are still not completed. The release of the district supervisors' organization and of the dispensary system which had been formed for the care of veterans left the hospital division to return to its old status of reestablishing second, third, and fourth class relief stations. Of course, most of these were already in existence, but they had been much enlarged in many cases to care for veterans' work. This necessitated a splitting of personnel, rearrangement of office space and clinical facilities, and a return to the basis which existed previous to 1919 in so far as was possible. It will undoubtedly require some months to make all of these readjustments, and in the process considerable negotiation with the Veterans' Bureau will be required.

At the present time some of these stations are still carrying veterans' work at the request of the Director of the Veterans' Bureau. While it was to the best interest of the Public Health Service to separate the work as far as possible, it was felt unjust to the Veterans' Bureau to withdraw suddenly, and the general policy of this division has been to comply with all requests for assistance of this character so far as possible. In some places this has meant considerable sacrifice on the part of the Public Health Service with reference to its own work and some of our stations are still carrying a volume of work in excess of the facilities available. The Veterans' Bureau is attempting to establish adequate facilities and as soon as this is done the hospital division will be able fully to reestablish its own stations for the care of its beneficiaries other than veterans.

Mention should be made also of the fact that the service up to the close of the fiscal year continued to discharge responsibilities relating to veterans with regard to certain districts outside of the continental United States. These districts, as noted in my last annual report, comprise the Hawaiian Islands, Panama Canal Zone, Porto Rico, Virgin Islands, and the Philippine Islands. More or less recently the Veterans' Bureau has begun to take over some of this work but the hospital division continued throughout the year to discharge these duties except in the Philippine Islands. The attitude of the service in this entire matter is to render whatever assistance the Veterans' Bureau may desire and to adjust itself to the taking over of these responsibilities by that bureau, either wholly or in part, at any time. The Veterans' Bureau has many times expressed its appreciation of this service and satisfaction with the way it has been rendered.

The supply of adequate hospital facilities for the care of ex-service men and women up to the time of the transfer of hospitals continued to be a matter of great importance. The pressure for additional beds of certain types, for the abandonment of unsuitable hospitals, and a general rearrangement of the beds in use were all factors of importance and received much consideration. The general changes which took place were in the way of more or less contraction with a better type of facilities and prospects were good for the early occupation of new beds made available under the legislation passed by Congress, appropriating \$18,600,000 for new construction. In fact, before the transfer of hospitals some of the beds provided under this appropriation became available. In addition the new hospital constructed at Dawson Springs, Ky., was opened during the year and the large naval hospital for tuberculosis at Fort Lyon, Colo.,

was transferred to the Veterans' Bureau and placed in operation under this division. Some hospitals were closed before the transfer, notably the large temporary hospital at Fox Hills, Staten Island, N.Y. The closure of this hospital was completed after the transfer.

The net result of these changes and rearrangements resulted in no increase in the total number of beds available. In fact, this total number was somewhat reduced but the character of the beds was better and the arrangements were more satisfactory. The additions made to the hospitals will be shown in detail further on.

At the close of the last fiscal year, the hospital numbers had reached 72. At the time of the transfer of the hospitals the highest numbered hospital was 82 with two annexes which, after the transfer were given numbers 83 and 84. The highest number assigned to any hospital by the hospital division was 82, so that this number marks the limit of hospitals operated by the Public Health Service.

The hospital division continued throughout the year to exert every effort to improve the efficiency of its hospital organization and administration. It is believed that at the time of the transfer of these hospitals the organization was working at its best and the Director of the Veterans' Bureau took pains to state on more than one occasion that the hospital system operated by the Public Health Service was giving entire satisfaction to his bureau. As a matter of record it seems wise to insert in this report the complete Executive order transferring the hospitals. This is, therefore, given below:

EXECUTIVE ORDER.

Whereas, section 9 of the act of Congress entitled "An act to establish a Veterans' Bureau and to improve the facilities and service of such bureau, and further to amend and modify the war risk insurance act," approved August 9, 1921, provides that—

Section 9. The director, subject to the general directions of the President, shall be responsible for the proper examination, medical care, treatment, hospitalization, dispensary, and convalescent care, necessary and reasonable after care, welfare of, nursing, vocational training, and such other services as may be necessary in the carrying out of the provisions of this act, and for that purpose is hereby authorized to utilize the now existing or future facilities of the United States Public Health Service, the War Department, the Navy Department, the Interior Department, the National Homes for Disabled Volunteer Soldiers, and such other governmental facilities as may be made available for the purposes set forth in this act; and such governmental agencies are hereby authorized and directed to furnish such facilities, including personnel, equipment, medical, surgical, and hospital services and supplies as the director may deem necessary and advisable in carrying out the provisions of this act, in addition to such governmental facilities as are hereby made available. * * *

And whereas said section 9 further provides that:

In the event that there is not sufficient Government hospital and other facilities for the proper medical care and treatment of beneficiaries under this act, and the director deems it necessary and advisable to secure additional Government facilities, he may, within the limits of appropriations made for carrying out the provisions of this paragraph, and with the approval of the President, improve or extend existing governmental facilities or acquire additional facilities by purchase or otherwise. Such new property and structures as may be so improved, extended, or acquired shall become part of the permanent equipment of the Veterans' Bureau or of some one of the now existing agencies of the Government, including the War Department, Navy Department, Interior Department, Treasury Department, the National Homes for Disabled Volunteer Soldiers, in such a way as will best serve the present emergency, taking into consideration the future services to be rendered the veterans of the World War, including the beneficiaries under this act.

Now, therefore, by virtue of the authority vested in me by said law, I direct that the following specifically described hospitals now under the supervision of the United States Public Health Service and operated for hospital or sanatoria or other uses for sick and disabled former soldiers, sailors, and marines, are hereby transferred to the United States Veterans' Bureau and shall on and after the effective date hereof operate under the supervision, management, and control of the Director of the United States Veterans' Bureau:

- No. 13, Southern Infirmary Annex, Mobile, Ala.
- No. 14, Annex to New Orleans Marine Hospital, Algiers, La.
- No. 24, Palo Alto, Calif.
- No. 25, Houston, Tex.
- No. 26, Greenville, S. C.
- No. 27, Alexandria, La.
- No. 28, Dansville, N. Y.
- No. 29, Norfolk, Va. (Sewells Point).
- No. 30, Chicago, Ill. (4629 Drexel Boulevard).
- No. 30, Chicago, Ill. (annex, 7535 Stoney Island Avenue).
- No. 31, Corpus Christi, Tex.
- No. 32, Washington, D. C. (2650 Wisconsin Avenue).
- No. 33, Jacksonville, Fla.
- No. 34, East Norfolk, Mass.
- No. 35, St. Louis, Mo. (5900 Arsenal).
- No. 36, Boston, Mass. (Parker Hill).
- No. 37, Waukesha, Wis.
- No. 38, New York, N. Y. (345 West Fiftieth Street).
- No. 39, Hoboken, Pa.
- No. 40, Cape May, N. J.
- No. 41, New Haven, Conn.
- No. 42, Perryville, Md.
- No. 44, West Roxbury, Mass.
- No. 45, Biltmore, N. C.
- No. 46, Deming, N. Mex.
- No. 47, Markleton, Pa.
- No. 48, Atlanta, Ga.
- No. 49, Philadelphia, Pa. (Grays Ferry Road and Twenty-fourth Street).
- No. 50, Whipple Barracks, Ariz.
- No. 51, Tucson, Ariz.
- No. 52, Boise, Idaho.
- No. 53, Dwight, Ill.
- No. 54, Arrowhead Springs, Calif.
- No. 55, Fort Bayard, N. Mex.
- No. 56, Fort McHenry, Baltimore, Md.
- No. 57, Knoxville, Iowa.
- No. 58, New Orleans, La. (439 Flood Street).
- No. 59, Tacoma, Wash.
- No. 60, Oteen, N. C.
- No. 61, Fox Hills, Staten Island, N. Y.
- No. 62, Augusta, Ga.
- No. 63, Lake City, Fla.
- No. 64, Camp Kearny, Calif.
- No. 65, St. Paul, Minn. (Dayton and Virginia Avenues).
- No. 67, Kansas City, Mo. (Eleventh and Harrison Streets).
- No. 68, Minneapolis, Minn. (914 Elliott Avenue).
- No. 69, Newport, Ky.
- No. 71, Sterling Junction, Mass.
- No. 72, Helena, Mont. (Fort William Henry Harrison).
- No. 73, Chicago, Ill. (annex to United States Veterans' Hospital No. 30).
- No. 74, Gulfport, Miss.
- No. 75, Colfax, Iowa.
- No. 76, Edward Hines, jr., Hospital, Maywood, Ill.
- No. 77, Portland, Oreg.
- No. 78, North Little Rock, Ark. (Fort Logan II. Roots).
- No. 79, Dawson Springs, Ky.
- No. 80, Fort Lyon, Colo., and
the purveying depot at Perryville, Md.

I hereby direct that the following hospitals now under construction by the Treasury Department or projected under existing law shall, when and as each is completed, be transferred to the United States Veterans' Bureau, and shall on and after the respective dates of such transfer be operated under the supervision, management, and control of the Director of the United States Veterans' Bureau.

Fort McKenzie, Sheridan, Wyo.
Fort Walla Walla, Walla Walla, Wash.
Excelsior Springs, Excelsior Springs, Mo.
Catholic Orphan Asylum (Bronx), New York
Central New England Sanatorium, Rutland, Mass.
Hospital at Tuskegee, Ala.
Hospital in western Pennsylvania.
Hospital on Jefferson Barracks Reservation, St. Louis, Mo.
Hospital in metropolitan district, New York.

All facilities, property, and equipment now in the possession of the United States Public Health Service in the hospitals above mentioned and all supplies in said hospitals and in the purveying depots at Perryville and North Chicago, purchased from funds allotted to said service by the Director of the United States Veterans' Bureau, are hereby transferred to the United States Veterans' Bureau.

It is hereby directed that the Surgeon General of the United States Public Health Service, the Director of the United States Veterans' Bureau, and the Director of the Bureau of the Budget shall each designate a representative to form a board, which board shall allocate to the United States Veterans' Bureau and to the United States Public Health Service, with due regard to their respective present and future needs, all supplies transferred to the United States Public Health Service by the War Department, Navy Department, or other governmental agencies, in accordance with law, and said board shall also allocate to the United States Veterans' Bureau and to the United States Public Health Service the buildings and facilities at the purveying depot at North Chicago, Ill., according to their respective needs.

All leases, contracts, and other obligations and instrumentalities of the United States Public Health Service in the District of Columbia or elsewhere, and all records, files, documents, correspondence and other papers relating to the service rendered by the United States Public Health Service in the operation of the hospitals and purveying depots hereby transferred or relating to the medical examination, assignment to hospitals, and treatment of persons who are now or who have been patients and beneficiaries of the United States Veterans' Bureau, are hereby transferred to the United States Veterans' Bureau as of the effective date of this order.

The Secretary of the Treasury, with due regard to the needs of the United States Public Health Service, shall authorize and direct the Surgeon General of the United States Public Health Service to detail to the United States Veterans' Bureau for duty until released by the Director of the Bureau, the commissioned personnel now on duty at the hospitals and purveying depots above mentioned and such other commissioned personnel as may be required for the operation of the veterans' hospitals and purveying depots, provided that the regular commissioned officers of the United States Public Health Service shall be subject to recall in the discretion of the Surgeon General of

that service. Such other personnel of the United States Public Health Service as are now paid from funds allotted by the Director of the United States Veterans' Bureau shall, subject to the approval of the director of the bureau, be transferred and given appointment in the United States Veterans' Bureau in the manner prescribed by civil service laws and regulations.

So that the transfer herein directed may be made with minimum inconvenience, this order shall be construed to allow administrative adjustment hereunder to be made effective May 1, 1922.

This order shall not be construed as in any way limiting or curtailing the authority conferred by existing law whereby the Director of the United States Veterans' Bureau may utilize the now existing or future facilities of the United States Public Health Service, the War Department, the Navy Department, the Interior Department, the National Homes for Disabled Volunteer Soldiers, or such other governmental facilities as may be made available for the use of the United States Veterans' Bureau.

(Signed)

WARREN G. HARDING.

THE WHITE HOUSE,

April 29, 1922.

The effect of this transfer, as stated, was to leave the Public Health Service in control and operation of the marine hospitals which have been under its direction for many years. The list of these hospitals is given below.

Type.	Hospitals.	Medical officers in charge.
General.....	No. 1, Baltimore, Md. (being reopened), (Remington and Wyman Avenues).	M. H. Foster, surgeon.
Do.....	No. 2, Boston, Mass. (Chelsea), (High Street).....	J. O. Cobb, senior surgeon.
Do.....	No. 3, Buffalo, N. Y. (2183 Main Street).....	J. W. Trask, surgeon.
Do.....	No. 4, Cairo, Ill. (closed), (Eleventh and Cedar)...	Roy E. Barrows, acting assistant surgeon.
Do.....	No. 5, Chicago, Ill. (4141 Clarendon Avenue).....	R. M. Grimm, surgeon.
Do.....	No. 6, Cleveland, Ohio (1041 Lakeside Avenue).....	H. W. Wickes, surgeon.
Do.....	No. 7, Detroit, Mich (Jefferson and Mount Elliott)...	E. R. Marshall, surgeon.
Tuberculosis.....	No. 8, Evansville, Ind. (1700 West Illinois Street)...	T. J. Lidell, surgeon (in temporary charge).
Do.....	No. 9, Fort Stanton, N. Mex. (R. R. Station—Capitan).	H. J. Warner, surgeon.
General.....	No. 10, Key West, Fla. (Front and Emma Streets).	G. M. Guiteras, senior surgeon.
Do.....	No. 11, Louisville, Ky. (Portland Avenue and Twenty-second Street).	John McMullen, surgeon.
Do.....	No. 12, Memphis, Tenn. (Delaware and California Streets).	James Brew, surgeon (R).
Do.....	No. 13, Mobile, Ala. (St. Anthony and Bayou)....	W. H. Slaughter, surgeon.
Do.....	No. 14, New Orleans, La. (Tchoupitoulas and Henry Clay).	R. E. Ebersole, surgeon.
Do.....	No. 15, Pittsburgh, Pa. (Fortieth Street and Penn Avenue).	C. H. Gardner, senior surgeon.
Do.....	No. 16, Portland, Me. (Woodfords Station).....	R. L. Wilson, surgeon.
Do.....	No. 17, Port Townsend, Wash. (Franklin and Quincy).	Emil Krulish, surgeon.
Tuberculosis.....	No. 18, St. Louis, Mo. (3640 Marine Avenue).....	L. P. H. Bahrenburg, surgeon.
General.....	No. 19, San Francisco, Calif. (Fourteenth Avenue and Lake).	L. L. Williams, assistant surgeon general.
Do.....	No. 20, Savannah, Ga. (York and Abercorn).....	J. T. Burkhalter, surgeon.
Do.....	No. 21, Stapleton, N. Y. (Bay Street).....	G. B. Young, senior surgeon.
Do.....	No. 22, Vineyard Haven, Mass.....	H. S. Mathewson, surgeon.
Do.....	No. 23, Wilmington, N. C. (closed).....	
Do.....	No. 43, Ellis Island, N. Y.....	W. C. Billings, surgeon.
Leprosarium.....	No. 66, Carville, La.....	O. E. Denney, surgeon (R).
General.....	No. 70, New York, N. Y. (67 Hudson Street).....	E. K. Sprague, senior surgeon.
Do.....	No. 82, Norfolk, Va. (Tanners' Creek).....	L. E. Hooper, surgeon.

It will be noted that two of these hospitals, No. 4 at Cairo, Ill., and No. 23 at Wilmington, N. C., are closed. A third, No. 1, at Baltimore, Md., which was closed for a time by reason of the fact that the veterans' hospital at Fort McHenry was able to receive beneficiaries other than veterans, is now in process of being reopened. This can not take place fully until certain construction work has been completed. For the most part the marine hospitals as physical plants are not in good condition. There is nothing more urgent than the reconditioning of these hospitals from a physical point of view. Most of them are old and they have not had a great deal of money spent upon them. The consequence is that of necessity the hospital division is now operating a system of hospitals which do not reflect credit upon the National Government so far as the physical plants are concerned. As soon as possible every effort should be made to secure the necessary funds to put these hospitals in proper condition.

The professional standards and facilities available in these hospitals are good, and they are fairly well equipped. Indeed, it would be safe to assert that never before in the history of the service has there been given any better class of professional service under better conditions, with the exception of the physical condition of the buildings.

The number of beneficiaries other than veterans treated by the hospital division during the last two years has exceeded anything in its entire history, and the volume of this work promises to increase steadily. The statistical details for the past year will be found in another section of this report. The work done for the Employees' Compensation Commission is increasing and there have been repeated requests on the part of other departments of the National Government for medical service, especially in the prompt treatment of injuries among employees and the making of physical examinations for those who enter the Government service. These are matters of great importance and their proper performance would inevitably result in far less expenditures on the part of the National Government. Unfortunately the service has neither the authority nor the funds to carry on this work to any great extent. It is believed that it would be greatly to the interests of the Government could this work be extended.

OUT-PATIENT FACILITIES.

The out-patient facilities which had been established for the care of veterans were transferred completely to the Veterans' Bureau under the terms of the following agreement:

DECEMBER 5, 1921.

Memorandum for Assistant Secretary Clifford.

At a meeting of the Federal Board for Hospitalization held in General Sawyer's office on December 2, 1921, the question of the operation of dispensaries by the Veterans' Bureau was discussed, the point at issue being just exactly the relationship which should be sustained between the Veterans' Bureau and the Public Health Service with regard to the establishment, maintenance, and operation of dispensaries.

After considerable discussion, it was formally agreed that the Public Health Service would concur in the desires of the Veterans' Bureau and release to the control of that bureau such dispensaries as had been established for the examination and care of veterans where this was desired. The Public Health Service would then readjust

its dispensary system for the care of beneficiaries other than veterans, in accordance with the needs of the situation, provided it was thoroughly understood that, in making this arrangement, the Veterans' Bureau thenceforth should assume the sole and entire responsibility for the development of a dispensary system for the care of veterans of the World War, leaving the Public Health Service, so far as veterans are concerned, to operate hospitals only for their benefit.

This agreement was one in principle only, and the details involved in the readjustment should be left to the representatives of the two bureaus. Your approval of this principle is requested, in order that steps may be taken by this bureau to readjust its dispensaries with the Veterans' Bureau, in order that this bureau may put into effect the details necessary to carry this agreement to accomplishment.

Respectfully,

H. S. CUMMING, *Surgeon General.*

JGT: omh

Approved:

EDWARD CLIFFORD,

Assistant Secretary.

HKR JGT CHL

This agreement required considerable negotiation for its final consummation. A board was appointed with representatives from the two bureaus involved, and after several sessions the transfer of dispensaries was accomplished on February 1, 1922. It will be noted that the agreement released the Public Health Service from any further responsibility in the development of these facilities for veterans. The actual transfer was accomplished under this order:

Memorandum for Assistant Secretary Clifford.

The United States Veterans' Bureau has expressed a desire to utilize, effective February 1, 1922, the facilities of the United States Public Health Service in respect to certain of its operating dispensaries and out-patient offices specifically as follows:

Philadelphia, Pa.	Cincinnati, Ohio.	Washington, D. C.
San Francisco, Calif.	Denver, Colo.	Seattle, Wash.
Portland, Oreg.	New Orleans, La.	Chicago, Ill.
St. Louis, Mo.	Nashville, Tenn.	La Crosse, Wis.
New Haven, Conn.	Albany, N. Y.	Minneapolis, Minn.
Milwaukee, Wis.	Los Angeles, Calif.	Baltimore, Md.
Pascagoula, Miss.	Little Rock, Ark.	Hartford, Conn.
Detroit, Mich.	Kansas City, Mo.	Green Bay, Wis.
Tacoma, Wash.	Ashland, Wis.	Bay City, Mich.
Providence, R. I.	Bridgeport, Conn.	

In meeting the wishes of the United States Veterans' Bureau in this particular, it is believed the method and line of procedure outlined in attached opinions of the legal unit of this service should be followed, and will be acceptable to the United States Veterans' Bureau.

Your approval is accordingly requested to the accomplishment of the object in view in the manner specified, not alone as to the units above specified but also to those similar units of this service as to which the Surgeon General of the United States Public Health Service may, in the future, find advisable to extend similar action.

A separate communication covering the dispensary at 113 State Street, Detroit, Mich., is herewith, effective January 18, 1922, and based upon specific request to that end from the Director United States Veterans' Bureau in communication dated January 12, 1922.

Respectfully,

H. S. CUMMING, *Surgeon General.*

Approved:

EDWARD CLIFFORD,

Assistant Secretary.

cwb:gfb

encls.

In the development of out-patient facilities it had been necessary for economical reasons to develop facilities which cared not only for veterans but also for beneficiaries other than veterans. The separation of these activities has required considerable adjustment, and many of them are not yet completely separated. This could not be done hurriedly for fear that the service would be interrupted. Through some of its agencies the hospital division is still caring for a large number of veteran out-patients and will continue to do so for some time to come.

Efforts are being made to reestablish the relief stations of this service which existed previous to 1919 on a basis comparable with the work they are required to perform. These constitute the second, third, and fourth class relief stations of this division and are rapidly being placed on a permanent basis. The process will probably not be completed until the close of the next fiscal year.

It may be noted that there has been considerable development in the out-patient facilities established for the care of beneficiaries other than veterans. This development is due to many factors, an important one of which is the care of beneficiaries of the Employees' Compensation Commission.

BENEFICIARIES OTHER THAN VETERANS.

The work of the hospital division in the care of its regular beneficiaries has shown a large increase during the past two or three years. This growth has been steady and it is believed it will be more or less permanent. This increase has occurred both in hospital patients and dispensary patients.

In addition, as stated, there are still being treated in hospital and in dispensary a considerable number of veterans. This will probably continue to be the case for some time to come. This leaves the hospital division, even after the release of the veterans' hospitals, still doing a large and important piece of work.

The future of this work is bright. The transfer of veterans' activities has left both the hospitals and the out-patient facilities of the service in fairly good condition and ready for any volume of work which may be thrown upon them. The hospitals are fairly well equipped, their professional standards are high, and professional service is good. Similar statements might be made regarding the out-patient facilities of the service. Manifestly, however, it will be difficult to continue to furnish the same high-grade facilities as was done when this division was charged with the veterans' work for the reason that many of these stations are now carrying only a small volume of work which will not justify large and complete establishments permitting the best professional work.

As was pointed out in my last annual report, there should be development in the work of the hospital division rendering service to other governmental departments in the way of furnishing relief for injuries sustained in line of duty and also in making physical examinations of governmental employees. To do this, however, as was pointed out, would require an increased personnel and an extension of facilities for which funds do not now exist.

FINANCES.

Detailed financial statements will be found elsewhere in this report. It may be stated here, however, that much effort has been expended in instituting an economical administration in the hospital division, including the introduction of a cost-accounting system in the various hospitals under its operation, together with the establishment of a rather rigid allotment system to all its activities.

Careful check has been kept upon the expenditures made and effort used to reduce the operating expenses to a reasonable basis and yet one which would permit a satisfactory service. The per diem costs in the hospitals of this division have been decreasing and at the present time make a creditable showing.

The largest part of the funds of this division are, of course, used in the operation of hospitals, and per diem costs in hospitals are, therefore, matters of paramount importance in the economical administration of the hospital division. A great deal of discussion has taken place before committees in Congress and elsewhere regarding these costs. Modern hospitals, with the addition of numerous activities which a short time ago were regarded as no particular part of a hospital, have become very complex organizations. Moreover, the intricacies of modern diagnosis and refinements in technique have also increased costs in hospitals. It is believed that the hospitals of this service show per diem costs quite comparable with other official hospitals or with civilian hospitals.

It is well recognized in modern hospital practice that a cost of \$4 per day per patient is reasonable and a cost of \$5 per day is by no means unreasonable. These costs are so much in excess of what is generally believed to exist that they always excite unfavorable comment on the part of persons not familiar with the developments in modern hospital practice.

The average cost of the operation of marine hospitals during the past fiscal year is computed at \$4.10. This cost includes all of the operating expenses of the hospitals including repairs and preservation of buildings and grounds. It also includes the salaries of commissioned officers. This average is distinctly increased by certain factors which can not well be eliminated in our hospital system. Among these factors is the operation of small hospitals, the overhead of which is always excessive. Such hospitals must be operated at certain points, however, to meet the requirements of the law. Also, the present condition of the physical plants in many cases necessitates a distinctly higher operating cost. This cost could be materially reduced if the hospitals were reconstructed to meet modern standards and requirements.

Under all the circumstances it is believed that with present economic and industrial conditions the cost shown can be regarded as satisfactory.

It may be interesting to quote here from a recent report made by Dr. Haven Emerson, of New York, after an investigation of the hospitals and dispensaries of Buffalo, N. Y. He states, for example, that the per diem cost for ward patients in some of the larger hospitals of New York City of the best type range from \$3.89 to \$5.89. Similar costs will be found to prevail wherever hospitals are operating in

accordance with modern standards. The computation of per diem costs is unfortunately not a standardized procedure and the published cost of hospitals can not always be taken to be the actual cost of operation. Where the proper items are included the costs will be found high.

SUMMARY.

During the year there were treated in the hospitals of this service, in round numbers, 237,000 veterans and 159,000 other beneficiaries, a total of 107,400 patients to whom were given 5,485,000 hospital relief days; out-patient treatment has been given to 164,800 veterans and to 124,000 other beneficiaries. The total number of such treatments was 649,200. A total of 162,000 medical examinations were furnished to veterans and 98,600 to other beneficiaries.

During its association with the veterans' work for the three years beginning March, 1919, the hospital division has cared for in hospital a total of more than 275,000 veterans, to whom were given more than 14,500,000 hospital relief days. In the out-patient clinics there were given about 2,000,000 treatments and about 1,500,000 physical examinations were furnished. It is probably no exaggeration to say that the representatives of the Public Health Service during this time have made personal contact with something like 1,000,000 individual ex-service men and women.

The Public Health Service has been subjected to considerable criticism in the performance of this work, but when consideration is given to the volume of work and the difficulties under which it is done, it is believed that it can be safely stated that the Public Health Service, in what was equivalent to a national emergency, successfully met the responsibility placed upon it by Congress.

PLANS AND RECOMMENDATIONS.

The plans of the hospital division, now that its relationship to the veterans' work is clearly defined, can be more easily formulated. A good deal of work will, of necessity, be devoted to a completion of the transfer of all of its activities involving veterans to the Veterans' Bureau. This will require time, but should be accomplished before the next fiscal year is finished. Some adjustments have already been made, but considerable reorganization yet remains to be accomplished before the hospital division can reassume the status in which it existed prior to 1919 as an efficient and economical organization. This reorganization can not be made hurriedly, but is slowly taking place. Effort will be devoted to the maintenance of high standards of professional care and treatment, together with an economical administration of all of its hospitals and other facilities.

Additions have been made to the hospital system which have increased its capacity to something over 3,000 beds, and even this number of beds is insufficient to care for its regular beneficiaries. Moreover, many of the beds are located in plants not in good repair, built many years ago. Rebuilding would be required to make them conform to modern standards.

There is nothing of more importance to the service than the expenditure of a considerable sum of money in reconditioning its hospital

buildings and facilities. Some of these plants are in such condition as to be discreditable to the National Government. Plans have been formulated but no actual steps have as yet been taken except in the case of the National Leper Home at Carville, La. This institution, which is operated as a marine hospital, was opened less than two years ago and has a bed capacity of about 200. These beds are filled and yet at the present time without any facilities to meet the demand there are applications on file for more than 150 persons. With the permission of the Bureau of the Budget bills have been introduced into Congress for the expenditure of \$650,000 at this plant to give an additional 300 beds. This bill has passed the Senate and is now on the calendar of the House awaiting action. The condition is urgent and it is hoped that favorable action may be taken at an early date.

Another addition to the hospital system made during the past two years is the new United States Marine Hospital at Norfolk, Va., for which funds were appropriated by Congress in 1919. The funds are not sufficient to complete this plant as it should be completed, and this is one of the most urgent construction needs.

It is recommended, however, that every effort be made to secure appropriate legislation at the earliest practicable date.

The details concerning the work of the various sections of the hospital division are given in the pages which follow. It is to be understood that these sections existed previous to the transfer of the hospitals and other facilities to the Veterans' Bureau. Of course with reduced volume of work the organization of the hospital division is at the present time much simpler than would appear from these reports. These sections have either disappeared or been merged with others, and consolidation has taken place until now the hospital division is operating with two major sections and only two individual units.

SECTION OF NEURO-PSYCHIATRY.

The endeavors of the neuropsychiatric section were continued in so far as circumstances permitted in accordance with the neuropsychiatric program that had been developed by the experience of the section since the earliest beginnings of the War Risk Insurance work.

The program of the neuropsychiatric section has been more than ever curtailed during the present fiscal year, however, by factors quite beyond the control of the section. The principal cause of this curtailment has been the removal from the jurisdiction of the section of certain fundamental duties that were originally an integral part of the program. Thus the district supervisors' offices with activities of the district psychiatrists were transferred from the jurisdiction of the Public Health Service on August 1, 1921. Then, on December 14, 1921, the function of transferring patients from home to hospital and on the same date from hospital to hospital was entirely assumed by the Veterans' Bureau. Again, the jurisdiction of Veterans' Bureau patients in contract hospitals was taken from the Public Health Service on August 1, 1921.

It followed, therefore, that during the latter part of the fiscal year the duties of the neuropsychiatric section were confined almost exclusively to the treatment of patients resident in hospitals under the

jurisdiction of the Public Health Service. In this way the broader aspects of the Veterans' Bureau neuropsychiatric problem were entirely lost to the neuropsychiatric section of the Public Health Service. For instance the unprecedented opportunities to develop a nation-wide mental hygiene service for Veterans' Bureau patients with all of its concurrent possibilities for the advancement of the science of public health has been irretrievably lost. Other features mentioned above were scarcely of less moment. Any problem of such proportions as that entailed by the care of Veterans' Bureau neuropsychiatric patients must of necessity be controlled by the minutest adherence to the fundamental principles of unity, coherence, and supervision under one general head. For this reason alone in the light of the gradual dispersion of authority the final acceptance of the remaining function of the neuropsychiatric section by the Veterans' Bureau was a wise move.

The history of the present fiscal year has shown that the plans made by the neuropsychiatric section have been based on the soundest of foundations. Predictions as to the patient population, the number of neuropsychiatric beds necessary to care for these patients, and the location of proposed hospitals have been borne out in every particular.

Probably the greatest difficulty experienced by this section has had to do with the obtaining of proper personnel to man the hospitals. It has been proven that it is unwise to depend upon the present supply of trained psychiatrists for this purpose. The number of such experienced psychiatrists is not sufficient to fill the demands either of the Public Health Service or of the community at large. The problem of the Public Health Service resolved itself into developing psychiatrists from such untrained material as was available. Plans were made to conduct small training classes at United States Public Health Service Hospital No. 37, Waukesha, Wis., and United States Public Health Service Hospital No. 44, West Roxbury, Mass., and to prepare the hospital then under alteration at Kings Bridge Road and Sedgwick Avenue, Bronx, N. Y., for teaching purposes on a large scale, after its opening. Operations were started at United States Public Health Service Hospitals Nos. 37 and 44, and the first classes of each hospital were just completing a five-months' course April 30, 1922. The course at Waukesha included instruction in neuroanatomy, pathology, and organic neurology, utilizing the facilities of certain institutions in Chicago. The course at United States Public Health Service Hospital No. 44 included training at the Boston Psychopathic Hospital in which an out-patient clinic of the Public Health Service was located.

In the belief that the acute emergency had in some measure passed, the neuropsychiatric section discouraged the practice of acquiring already existing properties which were bound to prove unsatisfactory for neuropsychiatric hospital purposes. It had proven by experience that the proposition of acquiring properties and of attempting to convert them into hospitals suitable for the care of neuropsychiatric patients was both unsatisfactory and expensive in the extreme. In lieu of accepting such emergency facilities construction was started on several new modern hospital units. Construction on such a unit with a capacity of 500 beds was started at United States Public Health Service Hospital No. 24, Palo Alto, Calif. Another one was

started at United States Public Health Service Hospital No. 42, Perryville, Md., capacity 300. This project is one unit of a proposed 1,200-bed hospital. Another unit was started at United States Public Health Service Hospital No. 62, Augusta, Ga., with a capacity of 300 beds.

During the fiscal year there was an increase of 809 neuropsychiatric beds in hospitals reserved exclusively for the care of neuropsychiatric patients. There has been a very considerable increase in neuropsychiatric beds also in general and tuberculosis hospitals.

A pressing need of the Public Health Service has been disclosed by the events of the present fiscal year. This need arises through the transfer of all of the neuropsychiatric facilities of the Public Health Service to the Veterans' Bureau. There are a considerable number of beneficiaries of the Public Health Service who suffer from neuropsychiatric disorders. There is no provision made by the Public Health Service for these beneficiaries. All such beneficiaries from the eastern part of the United States are sent to St. Elizabeths Hospital, Washington, D. C. This hospital is badly overcrowded, and a great deal of excess travel is incurred in sending patients to this hospital from distant points, and the patients are not under the control of the service after they are taken there. In the western part of the United States all patients are sent to one of the State hospitals in California. The same objections to this practice are found as outlined above for St. Elizabeths Hospital. It is apparent that a neuropsychiatric pavilion should be developed at one of the Public Health Service hospitals in the northeast, another in a service hospital in the South, and another in a service hospital on the west coast. Such pavilions could, it is believed, very readily care for all neuropsychiatric beneficiaries except the most acutely disturbed ones. If any patients were so acutely disturbed that they could not be cared for at these hospitals of the service, provision could be made to have them admitted to a near-by State hospital as is the practice now. They could be kept at the State hospitals for such time as their disturbed episode continued.

SECTION OF TUBERCULOSIS.

The chief activities of this section during the year were devoted to the administration of the tuberculosis hospitals. To the 13 tuberculosis hospitals in operation June 30, 1921, were added during the year the naval sanatorium at Las Animas, Colo., 700 beds, the newly built institution at Dawson Springs, Ky., 500 beds, and the converted Army post at Walla Walla, Wash., 165 beds. There are also in process of construction the sanatorium at Rutland, Mass., purchased under the auspices of the consultants on hospitalization, chiefly of permanent construction, and the improvised hospital at Excelsior Springs, Mo. Among the institutions transferred to the Veterans' Bureau on April 30, 1922, were 12 tuberculosis hospitals, aggregating 7,168 beds.

Two schools of instruction, 30-day courses, were conducted at United States Veterans' Hospital No. 60, Oteen, N. C., during the fiscal year, one in September and one in June. The former course provided training for approximately 45 and the latter for 72, including officers and nurses. A school was also conducted for chiefs

of medical service at United States Veterans' Hospital No. 26, Greenville, S. C. The training of medical officers assigned to duty in tuberculosis hospitals has been continued, each sanatorium constituting practically a continuous training school in the diagnosis and treatment of tuberculosis.

A special instructor assigned to visit the principal tuberculosis hospitals in turn has been continued on lecture duty. By popular talks and an intensive educational program among patients and employees the cooperation necessary in carrying out treatment has been enhanced.

Research work devoted to various aspects of natural and induced pneumothorax was conducted at United States Veterans' Hospital No. 41, New Haven, Conn., by Surg. (R.) J. C. Thompson and Surg. (R.) Nathan Barlow. Hygienic Laboratory bulletin "Small Pneumothorax" will shortly be published on this subject.

A 12,000-word pamphlet "Getting Well" was prepared for publication by various field officers and 50,000 copies printed for distribution to tuberculous veterans and other Government patients.

Indications of a reaction against the popular demand for climatic change has been noted in the increasing demand for hospital beds by tuberculous patients in large centers of population. The tuberculous patients at United States Veterans' Hospital No. 60, Fox Hills, N. Y., at one time numbered 546, which was greatly in excess of all other classes of patients under treatment there at that time. The veterans' hospitals at Baltimore, Md., Boston, Mass., and Chicago, Ill., respectively, have also been called upon to admit large numbers of tuberculous patients, many of whom declined transfer to sanatoriums in the arid Southwest and other climatic resorts where ample facilities had been provided in compliance with popular beliefs manifested only a few years ago. The popularization thus manifested of treatment in the home climate, even in general hospitals, especially of patients with advanced tuberculosis, is believed to be salutary.

Since May 1, 1922, it has been possible to give more detailed consideration to the hospitalization and other problems connected with the treatment of tuberculous merchant seamen and other beneficiaries, many of whom were at that date receiving treatment in United States veterans' hospitals but who, at the request of the Director, United States Veterans' Bureau, are being removed therefrom to Marine Hospital No. 9, Fort Stanton, N. Mex., or other hospitals designated by the Surgeon General for the purpose.

SECTION OF GENERAL MEDICINE AND SURGERY.

In the process of reorganization of the hospital division, this section took over certain activities formerly handled by other sections and units, and the work affecting general hospitals, including nurses, aides, dietitians, X-ray facilities, and care of seamen, became subsidiary to this section. In addition, all other work pertaining to general hospitals relating to construction, repairs, alterations, requisitions, and proposals for leases and contracts, came under the administration of this section. This change increased the activities of the section manifold as all matters pertaining

directly or indirectly to general hospitals naturally flowed through this section for action.

Six hospitals for the care of general cases were opened during the year, as follows:

United States Veteran's Hospital No. 30, Annex, Chicago, Ill.

United States Veterans' Hospital No. 75, Colfax, Iowa.

United States Veterans' Hospital No. 76, Maywood, Ill.

United States Veterans' Hospital No. 77, Portland, Oreg.

United States Marine Hospital No. 13, Annex, Mobile, Ala.

United States Marine Hospital No. 14, Annex, Algiers, La.

Special attention has also been given to increasing the efficiency of those hospitals already in operation. Repairs and alterations, and, in some instances, reorganization of personnel to meet the special needs of the station, have been made with a view to giving the finest service possible. Every effort has been made to furnish the best medical, surgical, dental, X-ray, physiotherapy, and occupational-therapy treatment, as well as to make the hospitals comfortable and cheerful; in short, to establish a high standard of service in every line to meet the needs of all classes of physical disability encountered in general hospitals. In this respect it is felt that the care and treatment rendered will compare favorably with that of other institutions throughout the country doing the same character of work. Frequent reports of inspection of hospitals, together with recommendations from outside sources as to certain changes which would increase the efficiency of the management and add to the comfort of the patients, or otherwise improve conditions, have been considered and acted upon.

During the year a special course in tuberculosis was arranged for certain medical officers and nurses in general hospitals; also a special course in gastroenterology, so as to have a personnel specially trained in these branches at general hospitals.

One of the most important activities of this section has been in connection with United States Public Health Service Hospital No. 66, the leprosarium located at Carville, La. Considerable new construction was completed at this station during the year, which provided for the accommodation of about 80 additional patients and increased the capacity of the institution to about 200. A number of persons afflicted with leprosy were transferred by special cars from New York, Chicago, and San Francisco to fill the quarters made available by the new cottages.

To meet the requirements of the Budget a system of allotment and cost accounting was established at all hospitals with most satisfactory results. It is now possible to arrive at the actual cost of operating each hospital, department by department, and the cost of each patient per day. Estimates are made in advance of the allotment and a strict check kept upon all expenditures.

With the transfer of the hospitals this section was merged with the section on tuberculosis and on neuropsychiatry and was given the responsibility of operating the marine hospitals as well as all of the dispensary facilities of the hospital division. The details of hospitals and dispensaries have been discussed elsewhere.

SECTION ON MISCELLANEOUS ACTIVITIES.

This section is one of the major administrative sections of the hospital division and has undertaken several functions which do not fall within the scope of the other major sections. Its organization was found necessary to expedite business.

It has been engaged in such activities as arranging for meetings of advisory committees on hospitals and caring for the records of the same; making all necessary arrangements for the opening and closing of hospitals; supervising the issuance of circulars and cooperating with the United States Veterans' Bureau in the publication and issuance of joint circulars concerning the business of the two bureaus; compiling data and information for the United States Veterans' Bureau concerning various angles of hospital activities; making certain investigations regarding standard requirements for hospitals; discharging certain functions with regard to miscellaneous allotments of funds; handling leases of hospitals and other properties; supervising inspection reports; revising certain blank forms; and some other miscellaneous minor activities.

In addition to this, this section has supervised a service now being rendered to ships at sea by radio through the stations of the United States Public Health Service. This is an interesting development in maritime medicine. Arrangements now exist whereby through the Radio Corporation of America and the Independent Wireless Telegraph Co. ships at sea in need of medical advice may obtain it through designated stations of the United States Public Health Service. This is carried on without any additional cost. It has attracted much attention and has undoubtedly been a service for good.

Through this division has been instituted also, quite recently, instructions in the principles of first aid for masters, mates, pilots, and engineers of the American merchant marine applying for original licenses.

This was instituted in accordance with a ruling made by the Secretary of Commerce requiring certificates from an officer of this service that all such applicants had passed a satisfactory examination in the principles of first aid. In cooperation with the Seamen's Church Institute of New York a "Manual of Ship Sanitation and First Aid" was issued as a textbook for this work. It is now organized and proceeding satisfactorily. Instruction is being given at about 45 stations.

UNIT OF RECONSTRUCTION.

Physiotherapy and occupational therapy have been continued in hospitals of the service along lines already established. Because of the transfer of contract hospitals to the control of the Veterans' Bureau about the first of the fiscal year the number of occupational therapy hours was somewhat decreased; also, owing to the transfer of dispensaries to the supervision of the Veterans' Bureau on February 1, the number of physiotherapy treatments was decreased. However, the increase of work in the older hospitals and the institution of physiotherapy and occupational therapy in new hospitals of the service to a large extent offsets this decrease, so that the number of patients treated by each of these therapies remained practically the same to May 1, the average number of physiotherapy treatments

being about 40,000 per week and the number of occupational therapy hours about 50,000 per week.

The method of disposal of the by-products of occupational therapy, i. e., articles fabricated, continued to give general satisfaction. Figures compiled to April 1, 1922, indicate the amount received from the sale of these articles in the United States veterans' hospitals in many instances is from 25 to 67 per cent of the cost of expendable material for the work. United States Veterans' Hospital No. 50, Prescott, Ariz., making the best showing in this respect, followed by United States Veterans' Hospital No. 29, Norfolk, Va., United States Veterans' Hospital No. 19, San Francisco, Calif., and United States Veterans' Hospital No. 7, Detroit, Mich.

In October, 1921, two assistant superintendents were appointed in the field, and the service received marked benefit from the detail of these assistant superintendents to other hospitals in the vicinity of their stations for conference with the medical officers in charge and with the reconstruction personnel concerning the application of these forms of therapy. The benefits were twofold. First, the assistant superintendents were able to assist the personnel at the stations to increase the efficiency of the work; second, they were able, because of their experience in the bureau, to submit reports to the reconstruction unit, which gave a much more valuable outline of the results and the needs of physiotherapy and occupational therapy at the stations than could be obtained from the general inspection reports. However, because of the lack of provision for this grade in the amendment of the regulations, it was necessary to discontinue the assistant superintendents, effective April 1.

While the larger part of the reconstruction activities was carried on in hospitals which were transferred to the Veterans' Bureau May 1, physiotherapy and occupational therapy will be continued as activities of the hospital division, as it is felt that patients at Public Health hospitals and dispensaries should have the advantages of the most modern forms of therapy which can be made available.

UNIT OF DENTISTRY.

Beginning with July 1, 1921, the dental unit gave its undivided attention to the dental clinics in each of the hospitals directed by the Public Health Service and to the 13 out-patient dental clinics which were being operated at that time. It was found that to render the proper dental treatment to hospitalized patients it was necessary to install equipment and appoint a dental officer for each 100 patients. This policy was carried into effect wherever conditions would permit.

Considerable trouble had been caused up to this time due to the fact that at most stations nurses had been detailed for duty in the dental clinic by the medical officer in charge. These nurses were usually allowed to remain but one month in the dental clinic and would then be instructed to report back to the hospital wards for duty and another nurse detailed to take her place. This condition caused more or less confusion, as a nurse not familiar with the duties of a dental assistant would be assigned at about the time a former nurse had properly learned her duties and had become of real value. For this reason the Civil Service Commission opened an examination for surgeons' assistants. Any trained person who had at least one

year's experience in nursing or as a doctor's or dentist's assistant was eligible. These surgeons' assistants were selected and placed on duty to assist the dentists wherever this was practicable.

From the beginning of the fiscal year until February, 1922, there were on duty in the dental clinics, both in hospitals and at out-patient dispensaries, 169 dental surgeons, 14 oral hygienists, 17 dental mechanics, and 124 dental assistants and nurses. There were 233 dental equipments either installed or in the process of installation at that time.

On February 1, 1922, all of the out-patient dispensaries were transferred to the Veterans' Bureau, including equipment, supplies, etc. These dispensaries were located at Chicago, Cincinnati, Denver, Los Angeles, Minneapolis, Philadelphia, Portland, Oreg., San Francisco, Washington, D. C. (St. Elizabeths), St. Louis, St. Paul, Seattle, and Washington, D. C. Ten complete equipments were transferred from the Washington dispensary. There were transferred at this time 58 dental surgeons, 7 oral hygienists, and 17 dental mechanics. On May 1, 1922, all Veterans' Bureau hospitals were transferred to the Veterans' Bureau, and at that time 88 dental surgeons, 5 oral hygienists, and 12 dental mechanics were transferred to that bureau.

There are on duty in the Public Health Service marine hospitals and at the Washington out-patient dispensary at the present time 23 dental surgeons, 1 oral hygienist, and 3 dental mechanics. During this fiscal year the dental clinics under the Public Health Service completed 36,646 prophylactic treatments; 42,897 extractions; 89,141 fillings, including amalgam and gold; 9,967 prosthetic appliances; and made 64,259 complete mouth examinations. This treatment was rendered at an overhead expense of \$714,002.58, which includes the cost of all supplies, salaries of all officers and employees, rent, heat, and electricity, 10 per cent depreciation per annum, and 6 per cent interest per annum on the cost of all purchased dental equipment. Had this amount of treatment been rendered by civilian dental examiners on a fee basis it would have cost \$1,103,146, as computed according to the fees allowed by the Veterans' Bureau fee table. The figures as given above show a net saving to the Government of \$389,143.42 on dental treatment alone. These figures show only the financial side of the proposition. It has, however, been proved that the treatment received at clinics operated by officers of the Public Health Service has been a great deal more uniform and satisfactory to the patients. In every city where a clinic is successfully operated it has been found that the claimants, with very few exceptions, preferred to have their dental treatment rendered at the clinic rather than through the medium of dental examiners.

UNIT OF LABORATORIES, INCLUDING X-RAY.

The activities of this unit have continued along the lines reported last year. The functions of the unit, in general, include recommendations for the recruitment, appointment, and transfer of technical and other personnel; advice relative to the construction of laboratories in hospitals, with special regard to the location of apparatus and the installation of electrical connections; the super-

vision of the purchase, distribution, and transfer of laboratory equipment and accessories; installation and repair of the equipment at various stations; instructions in the use and care of certain equipment and the general supervision of all laboratory activities.

It is gratifying to note that most of the hospitals under the operation of the hospital division have been equipped with good laboratories, both clinical and X ray, and these laboratories have been supplied with adequate personnel.

At the time of the transfer of the hospitals there were on duty in laboratory and X-ray work 57 commissioned personnel and 175 technical personnel. Seventy hospitals were equipped with X-ray laboratories and there had been made 257,674 X-ray exposures. After the transfer of the hospitals the laboratory unit was merged with the section on general medicine and surgery and the laboratories in the marine hospitals have continued to function as before, giving a satisfactory service. Effort will be made to keep these laboratories well equipped and serviceable.

UNIT OF NURSING.

During the past year the nursing service has settled into a more stable organization and the service has been able for the past 6 months to meet the needs of nurses to all stations. New hospitals opening have been staffed with nurses who already have had a tour of duty in some other hospital of the service, and in every instance one of the assistant superintendents of nurses has been placed in charge as chief nurse until the hospital was open and running fairly well. By this method the confusion and discontent in this personnel on the opening of new hospitals which had existed previously was done away with.

The outstanding accomplishments for the year may be listed as follows: Appointment of assistants for recruiting; establishment of school at Oteen; establishment of training school at Fort McHenry.

The three assistant superintendents were appointed in April, 1921, for recruiting duty and for inspection of the nursing service in hospitals in their respective districts. The shortage of nurses was very pronounced at the time of their appointment, and in a very short time through their efforts all vacancies, about 300, were filled and there was a waiting list of about 250 nurses available for appointment.

The school at Oteen was established for the purpose of giving intensive instruction in tuberculosis nursing to a specified number of students. It was conducted in conjunction with a similar school for officers. Miss Alice Stewart, of the Pittsburgh Tuberculosis League, was appointed as instructor and the results obtained in a better understanding of the principles of tuberculosis treatment by the members of the class more than justified the experiment.

Not the least important was the establishment of a training school for student nurses at Fort McHenry. This school opened on January 1, 1922, with 15 students, of whom 13 were accepted after the preliminary course. All students are high-school graduates and many have college training. The type of student is reported as very high, their interest in the school very great, and their school averages

excellent. Almost without exception they are reported as excellent material, and the small percentage not accepted shows the value of the high standard and the careful selection. The first group are now giving four hours duty daily on the wards. Six entered in the second group and 15 have been accepted for September 1.

This school was transferred to the Veterans' Bureau by Executive order on May 1, with the 57 hospitals for Veterans' Bureau patients, but it is hoped that the training school may be returned to the Public Health Service, since the students entered into an agreement with the Public Health Service, and not with the Veterans' Bureau. The Public Health Service has greater facilities for giving proper training and is more interested in the educational work and has a very definite responsibility to these students. The acute service in the Veterans' Bureau will without doubt decrease all the time, and the facilities for proper experience for students decrease proportionately. Furthermore, it would seem that the Public Health Service assumed a definite responsibility to these students when it offered the course of training and secured nurses, and that this responsibility can not be lightly set aside.

By a change in regulations effective April 1, the assistant superintendents of nurses, of whom there were five, were demoted to the grade of chief nurse, with one exception, and this demotion worked great hardship to these faithful and loyal employees, all of whom have given three years of service and who might be justified in expecting a different kind of reward for faithful and efficient service. They all accepted this demotion, however, without complaint.

With the transfer of veterans' hospitals to the Veterans' Bureau, 1,442 nurses were transferred to the Veterans' Bureau with an ex-assistant superintendent of nurses in charge.

There are left in the hospital division of the Public Health Service 310 nurses. The dietitians and reconstruction aids have been placed under the nursing department since the transfer of hospitals, and there are, in addition to the 310 nurses, 65 aids and 21 dietitians on duty in marine hospitals, making a total personnel of 397.

UNIT OF DIETETICS.

This unit during the year continued to function as previously, extending its activities further in the matter of supervising the purchasing of raw food materials and in the matter of issuing instructions regarding the preparation and serving of a varied diet in the hospitals. Careful check was kept on subsistence contracts and hospital menus. Also supervision was exercised over food wastes and economic administration.

At the time the hospitals were transferred to the Veterans' Bureau, there was a total of 149 dietitians on duty, including head dietitians, assistant superintendents, and one superintendent. The turnover of personnel during the year was rather large, 62 resignations having taken place. One hundred and twenty-six dietitians were transferred to the Veterans' Bureau with the hospitals, leaving 23 in the marine hospitals.

This unit, after the transfer, was consolidated with the nursing unit and now operates under the nursing unit where it performs the same character of service as was previously performed. At the present

time the number of hospitals does not justify the overhead involved in the employment of a superintendent.

UNIT OF STATISTICS.

The work of the statistical section was gradually expanded during the first 10 months of the fiscal year. Then came the sudden deflation caused by the transfer of the direct supervision of the hospitalization of disabled veterans to the Veterans' Bureau. The program for the last two months of the year has been one of curtailment and readjustment. It seems advisable to treat the two periods separately.

During the period of expansion, considerable progress was made in the work of coding and tabulation of the information contained on in-patient record cards (Form 1971-F). The new edition of the "Nomenclature of Diseases and Conditions" was made available for use early in the year, and the work of coding, which had been held up pending this revision, was resumed on an extensive scale. By diverting as large a portion of the personnel of the section as could be spared from other branches of the work to the work of coding it was possible to handle much of the accumulated data in addition to the current records.

The following routine reports were prepared and issued by the section: Consolidated weekly census report of service hospitals; weekly census report supplement (classification of beds and patients by districts and disease); monthly tables of relief furnished to Veterans' Bureau and non-Veterans' Bureau patients in United States Marine and United States Veterans' Bureau hospitals; monthly table of transactions at first-class stations and other relief stations (classified according to beneficiary); monthly cost per diem chart; monthly ration cost chart. In addition to the routine work, many special chart studies of the activities of the service have been produced.

During the period of curtailment the general scope of the work has been necessarily reduced. The work of coding has suffered most due to the pressure of routine administrative work. The weekly census report and ration and cost per diem charts have been maintained in an abridged form. At the present time the section is fairly well adjusted to the new conditions, so that during the coming year the work can be efficiently and economically carried on.

The statistical unit, which is really a record unit, has been confronted with almost an insoluble problem throughout this work. It has been generally recognized both by the Veterans' Bureau and the Public Health Service that much more extensive records should be kept in this unit than have been kept, and the Veterans' Bureau has been urged on many occasions to take over this work and develop it. This bureau, however, has felt that they were unable for the time to undertake this, and the work has therefore continued under the Public Health Service in such a curtailed form as to leave much to be desired. Statistical data much wider in nature will undoubtedly have to be compiled, but this responsibility now lies with the Veterans' Bureau. Subsequent to the transfer of hospitals the hospital division has carried only a very much modified statistical unit.

MISCELLANEOUS.

The activities of several units might be grouped under one heading.

The unit of supplies, the functions of which consist in the supervision and approval of requisitions for supplies to be filled by the Purveying Service, carried on its usual activities. Subsequent to the transfer this activity was no longer necessary and was combined with other work.

The unit of inspection reports carried on its usual work during the year. Up to the time of the transfer this unit handled 509 inspection reports. This unit discharged an important duty.

The unit of library service. This unit, supplying books and magazines for patients, underwent considerable change during the year. This work, which had been carried by the American Library Association, became, through funds appropriated by Congress, an official activity. The personnel was taken over on the pay rolls of the Public Health Service, and this important work was continued as previously.

Through this unit fine collections of books and journals have been supplied to all of the hospitals of the service caring for veterans. This has proven a morale agency of the very first order and has contributed much to the successful operation of the hospitals under this division.

The transfer of hospitals has left the marine hospitals in a position of not being able to employ local librarians, but the American Library Association has given the use of the books collected at these hospitals by them and arrangements are being made to secure a library service through contact with local public libraries, which it is hoped may prove satisfactory. During the year the circulation in these libraries for 10 months was 227,309 books, being an average monthly circulation of 22,730.

Comment has been made previously concerning the *medical social service* carried on in the hospitals through the American Red Cross. This highly important service is likely to terminate in most of the hospitals of the service during the coming year on account of the transfer of veterans from the marine hospitals. The replacement of this service offers a difficult problem, but it is hoped that some satisfactory arrangement may be made before the American Red Cross withdraws completely.

Special acknowledgment is due to the American Red Cross and the American Library Association for their splendid cooperation and excellent service.

The unit of authorizations and contracts has handled authorizations, contracts, cost accounting system, and financial matters for the entire division.

The unit of medical libraries has been engaged in the selection, purchase, and distribution of medical books and magazines to the various hospitals and stations operating under this division. It has also attempted to formulate general policies with regard to medical literature and the creation of medical libraries throughout the hospital system.

UNIT OF MAINTENANCE.

Under date of October 1, 1921, that part of the hospital division known as the engineering section was designated as unit of main-

tenance and functioned as such until transferred to the Veterans' Bureau under Executive order effective April 29, 1922.

The activities of the section continued along the lines of preceding years, but with a decrease in new construction and an increase of minor repair work handled. Coordination with the Supervising Architect, Treasury Department, resulted in the major alteration and remodeling at Excelsior Springs, Mo., and Gulfport, Miss., being done through that office. The preparation of drawings and specifications progressed satisfactorily; the supervision of work in the field by special representatives gradually lessened as projects were completed or conducted by the Supervising Architect; the handling of the acquisition of properties by lease or otherwise was eliminated at the beginning of the year by the transfer to the legal section of the personnel taking care of such work.

Considerable time was devoted to a very necessary standardization of methods of reporting desired repair work from the field and of procedure in handling such reports in the bureau. The work of obtaining assignment records and necessary data on the properties of the bureau was carried on through the year as rapidly as possible with the force available.

Four hospitals were closed during the year, namely, No. 38, New York City, a general hospital; No. 58, New Orleans, a neuro-psychiatric hospital; No. 60, Fox Hills, Staten Island, N. Y., general hospital; and No. 70, Chicago, Ill., neuro-psychiatric hospital (annex to No. 30.)

All salvage work was completed at Jacksonville, Fla.

Carrying on the activities of the section to May 1, 1922, involved expenditures and obligations amounting to approximately \$884,000.

On May 1, 1922, the entire personnel of the unit was transferred to the United States Veterans' Bureau in accordance with Executive order.

The maintenance and repair of marine hospitals was thereafter carried on along with other functions of the hospital division temporarily and no special organization was created for this purpose. It is purposed to secure an assignment from the Supervising Architect's Office of a constructing engineer who will have these matters in charge as soon as this can conveniently be done.

No.	Location.	Type.	Capacity.	Ownership.
72	Helena, Mont.....	General.....	158	Land and buildings Government owned.
73	Chicago, Ill.....	.....do.....	100	Land and buildings leased.
74	Gulfport, Miss.....	Neuro-psychiatric.	160	Do.
75	Colfax, Iowa.....	General.....	202	Do.
76	Maywood, Ill.....	.....do.....	925	Land and buildings Government owned.
77	Portland, Oreg.....	.....do.....	150	Land and buildings leased.
78	North Little Rock, Ark.....	Neuro-psychiatric.	240	Land and buildings Government owned.
79	Dawson Springs, Ky.....	Tuberculosis.....	346	Do.
80	Fort Lyon, Colo.....	.....do.....	700	Do.
81	New York, N. Y. (Bronx).....	Neuro-psychiatric.	343	Do.
82	Norfolk, Va. (Tanners Creek).	General.....	150	Do.

DESCRIPTION OF HOSPITALS.

UNITED STATES VETERANS' HOSPITAL NO. 73, CHICAGO, ILL.⁵

This property consists of a building constructed for a private hospital which required practically no remodeling to fit it for Government use. It was closed as an independent hospital December 17, 1921, and is now being operated as an annex to hospital No. 30. Capacity, 100 patients.

UNITED STATES VETERANS' HOSPITAL NO. 74, GULFPORT, MISS.⁵

Leased property used by the Navy Department during the war as a training camp. Portions of the buildings are of tile, frame, and stucco, constructed for the Mississippi Centennial Exposition; the remainder are of wartime, temporary wooden construction. Considerable remodeling and repair work was done at a cost of approximately \$150,000 to fit the buildings for the care of neuro-psychiatric patients. Capacity, 160 patients.

UNITED STATES VETERANS' HOSPITAL NO. 75, COLFAX, IOWA.⁵

Leased property consisting of a resort hotel building with power house and a small number of subsidiary buildings. Part of the construction is fireproof with remainder of heavy timber frame and plaster. It is situated $1\frac{1}{2}$ miles from the town of Colfax, Iowa, and is reached by electric railroad operated under lease by the Public Health Service, in conjunction with the hospital. A moderate amount of repairs and alterations to provide operating facilities and other requirements for the care of patients was made by the Government under the terms of the lease. Capacity, 202 patients.

UNITED STATES VETERANS' HOSPITAL NO. 76, MAYWOOD, ILL.⁵

Main hospital consists of a building started under the auspices of the War Department during the World War.

This building, which is over 2,000 feet long and of permanent construction, was completed and five subsidiary buildings were constructed under a special appropriation in Public Act No. 326 of the Sixty-fifth Congress.

The grounds contain about 325 acres and are being attractively developed in accordance with the scheme prepared by a competent landscape architect.

The main building accommodates 925 patients, and in addition houses a large proportion of the operating personnel.

UNITED STATES VETERANS' HOSPITAL NO. 77, PORTLAND, OREG.⁵

Permanent fireproof building of city type; leased in an unfinished condition and completed by the owners in accordance with plans prepared by the Public Health Service. The property is well located in a residential district of Portland, occupying an entire city square—about 1 acre. Capacity, 150 patients.

⁵ Designation changed from "U. S. Public Health Service Hospital" at the beginning of the calendar year 1922.

UNITED STATES VETERANS' HOSPITAL NO. 78, NORTH LITTLE ROCK,
ARK.⁵

Formerly United States Army post, Fort Logan H. Roots. The buildings, which have been remodeled for the care of neuro-psychiatric patients and attending personnel, are of the type of brick construction usual at permanent Army posts. There are, in addition to these permanent structures, a considerable number of temporary wooden buildings erected during the war, some of which are used for storage purposes. Area of reservation, 1,088 acres. Capacity, 240 patients.

UNITED STATES VETERANS' HOSPITAL NO. 79, DAWSON SPRINGS, KY.⁵

A permanent tuberculosis hospital. Constructed under a special appropriation in Public Act No. 326, Sixty-fifth Congress, upon a site of approximately 5,000 acres donated to the Government. It consists of an infirmary building, seven ambulant and semiambulant wards, power house, recreation building, mess hall and kitchen, and quarters for personnel, all of permanent type. Situated 3 miles from the village of Dawson Springs, to which it was necessary to build a permanent road in order to secure access to railroad transportation. Capacity, 500 patients.

UNITED STATES VETERANS' HOSPITAL NO. 80, FORT LYON, COLO.⁵

An old Army post transferred to the Navy Department and developed by that department as a tuberculosis hospital. The buildings are divided as to type into permanent and semipermanent, and although most of them are old, they are well adapted to the care of tuberculous patients. Area of reservation, 1,160 acres. Situated 5 miles from the town of Las Animas, Colo., and reached by autobus. Practically no remodeling work was done by the Public Health Service. Capacity, 700 patients.

UNITED STATES VETERANS' HOSPITAL NO. 81, BRONX, N. Y.⁵

This property was purchased by the Treasury Department under the provisions of the first Langley bill and remodeled for the care of neuro-psychiatric patients. The plans contemplate an ultimate capacity of 1,000 beds, of which 343 were developed at the time the hospital was transferred to the United States Veterans' Bureau.

The two main buildings of the group which will house the patients are five stories high, of fireproof construction, planned and constructed as a Catholic orphanage. Area of grounds 29.8 acres.

UNITED STATES MARINE HOSPITAL NO. 82, NORFOLK, VA.

Site was purchased and permanent buildings erected under special appropriation in Public Act No. 326, Sixty-fifth Congress. Plans contemplate an ultimate capacity of 250 beds, of which 150 have been

⁵ Designation changed from "U. S. Public Health Service Hospital" at the beginning of the calendar year 1922.

developed at the present time. Area of grounds, 23 acres. Location, 1½ miles from the center of Norfolk.

As a matter of official record, there is inserted in this report an order issued by the Secretary transferring from the Public Health Service to the Bureau of War Risk Insurance the organization of district supervisors. This was omitted from last year's report, and is included here as a matter of record.

Order relative to the transfer of certain activities of the United States Public Health Service relating to beneficiaries of the Bureau of War Risk Insurance, including trainees of the Rehabilitation Division of the Federal Board for Vocational Education, to the Bureau of War Risk Insurance.

TREASURY DEPARTMENT,
OFFICE OF THE SECRETARY,
Washington, April 19, 1921.

To the Surgeon General and medical officers of the United States Public Health Service, Director of Bureau of War Risk Insurance, and others concerned:

1. All of the activities of the United States Public Health Service, with the exception of such hospitals and dispensaries as are operated by that service, in so far as they affect the beneficiaries of the Bureau of War Risk Insurance, including trainees under the Rehabilitation Division of the Federal Board for Vocational Education, are hereby transferred to the Bureau of War Risk Insurance, and the Director of the Bureau of War Risk Insurance is hereby directed to assume and administer such activities and shall hereafter be responsible for the examination, hospitalization, and proper and satisfactory medical care and treatment, including supplies, for the said beneficiaries.

2. Personnel.

(a) Such Regular and Reserve commissioned officers of the United States Public Health Service concerned in or with the activities to be assumed and administered by the Bureau of War Risk Insurance are hereby detailed and assigned for duty to and shall be under the direction and subject to the orders of the Director of the Bureau of War Risk Insurance. Such officers shall be immediately notified of such detail by the Surgeon General of the United States Public Health Service. As soon as practicable the Regular commissioned officers will be released from duty with the Bureau of War Risk Insurance. In the event that the services of any Reserve commissioned officer shall become unnecessary, the Surgeon General of the Public Health Service shall be so advised.

(b) All personnel of the United States Public Health Service other than that mentioned in paragraph (a) who are employed in the District of Columbia and elsewhere and who are engaged in the activities to be assumed by the Bureau of War Risk Insurance are hereby transferred to and shall be carried on the rolls of the Bureau of War Risk Insurance.

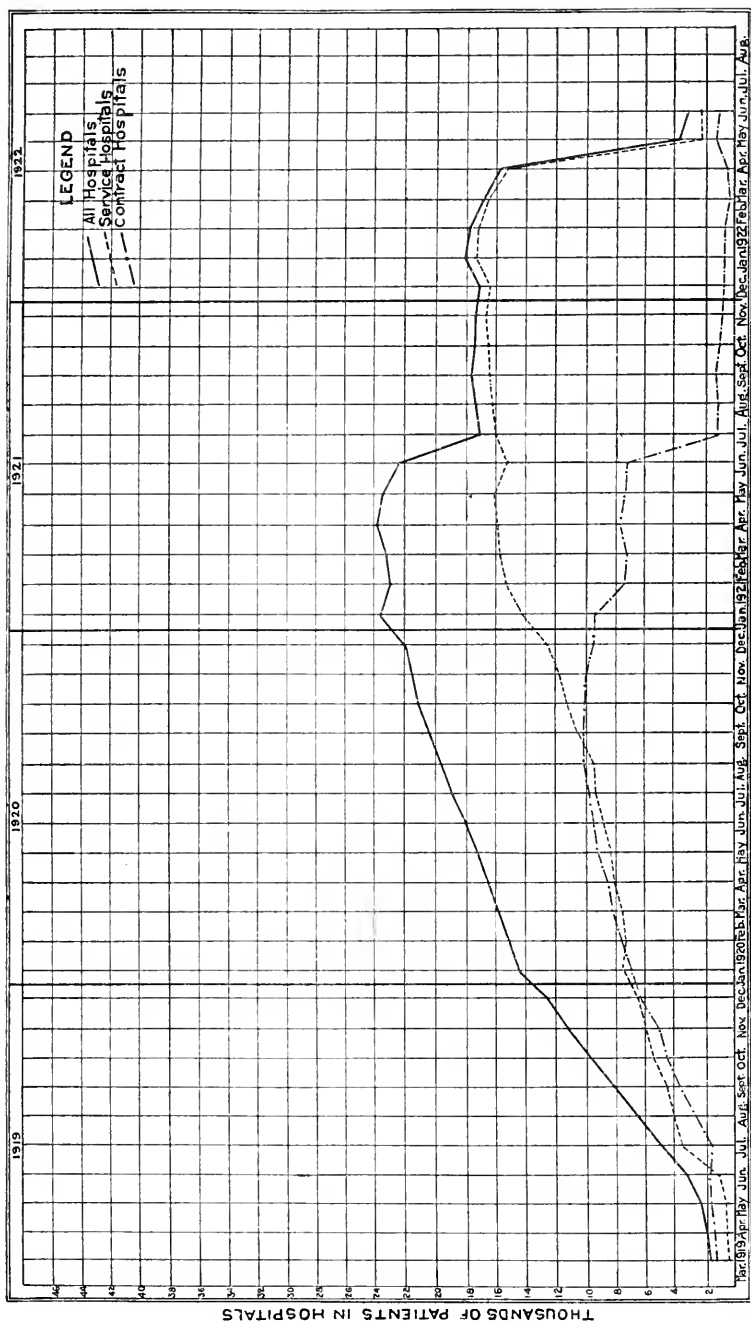
3. All papers, records, files, documents, and correspondence of the United States Public Health Service pertaining to the activities to be assumed by the Bureau of War Risk Insurance, together with all facilities, including vehicles and other equipment now on hand and in use by the United States Public Health Service for the administration and execution of such activities, shall be delivered into the custody of the Director of the Bureau of War Risk Insurance.

4. The offices and buildings now occupied by the United States Public Health Service, which are used for the activities to be assumed by the Bureau of War Risk Insurance, shall be made available for the use of the Bureau of War Risk Insurance in such manner and to such extent as, in the opinion of the director, may be necessary for the proper administration of such activities.

5. All Treasury Department orders and circulars in conflict with this order are hereby modified to accord herewith.

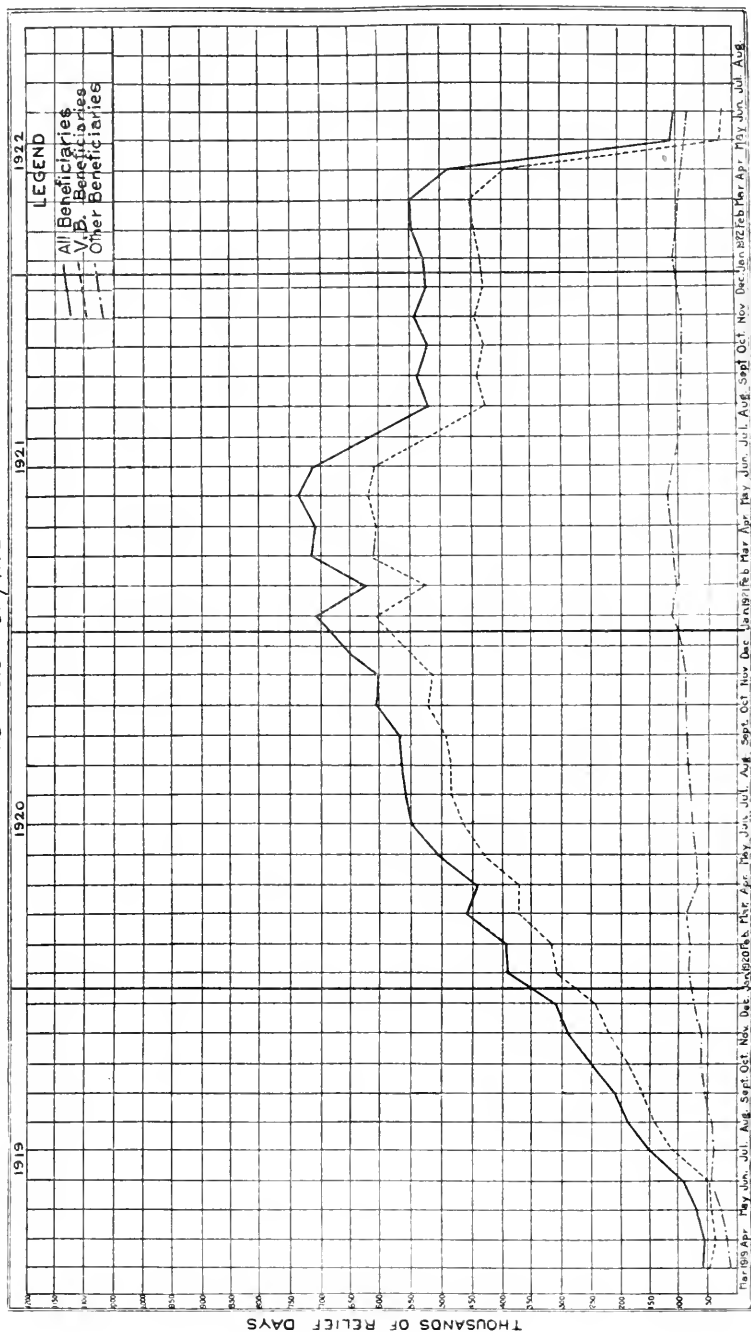
A. W. MELLON,
Secretary of the Treasury.

NUMBER OF PATIENTS IN HOSPITALS AT END OF EACH MONTH
U.S.P.H. SERVICE, CONTRACT, AND ALL HOSPITALS
March 1919 — Jul. 1922



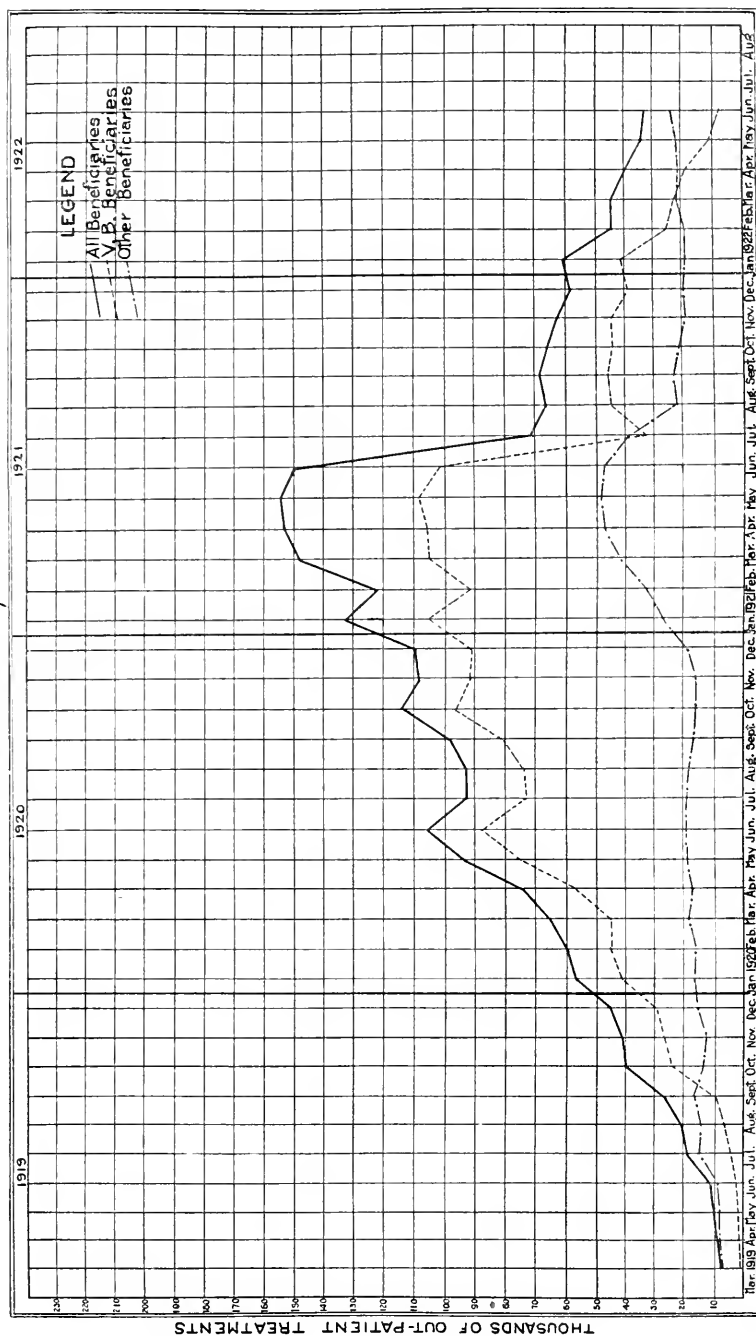
NUMBER OF HOSPITAL DAYS RELIEF FURNISHED BY MONTHS ALL STATIONS OF THE U.S. PUBLIC HEALTH SERVICE

March 1919—July 1922



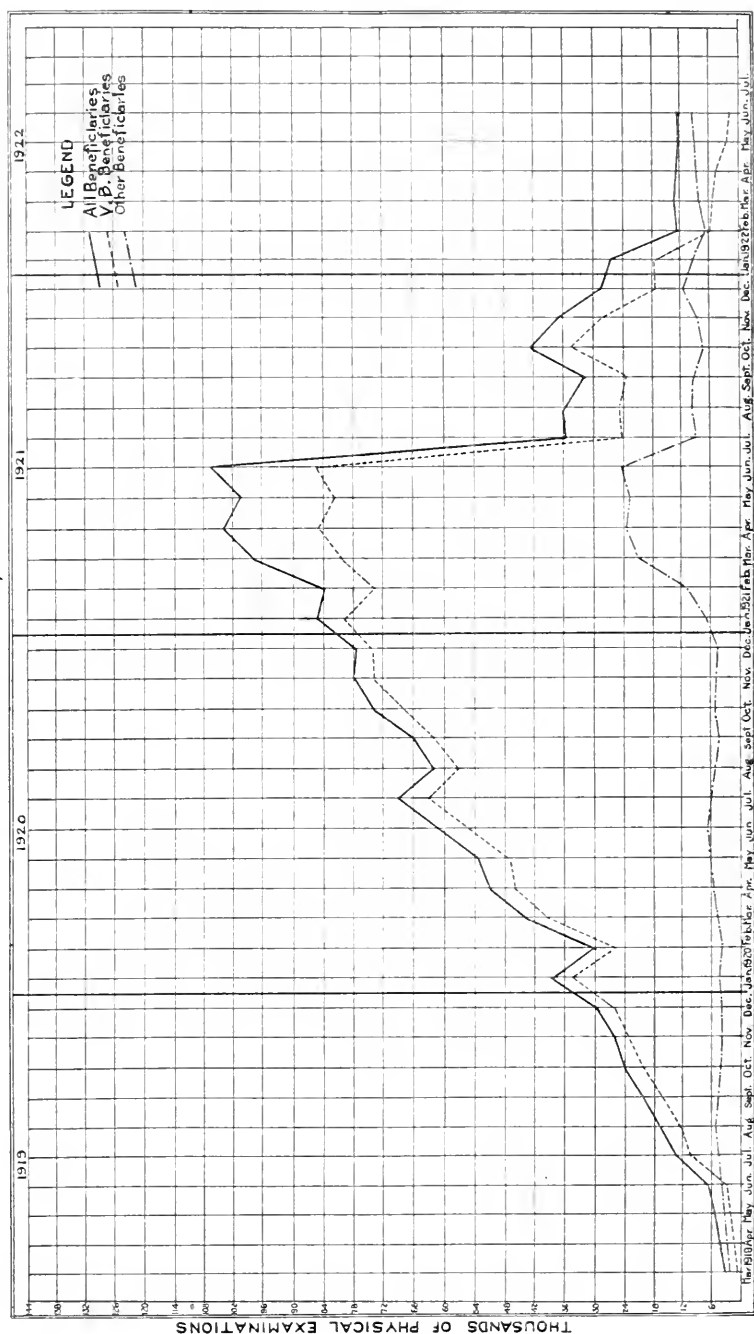
NUMBER OF OUT-PATIENT TREATMENTS FURNISHED BY MONTHS ALL STATIONS OF THE U.S. PUBLIC HEALTH SERVICE

March 1919—July 1922



NUMBER OF PHYSICAL EXAMINATIONS FURNISHED BY MONTHS
ALL STATIONS OF THE U. S. PUBLIC HEALTH SERVICE

March, 1919—July, 1922



STATISTICAL TABLES.

TABLE I.—*Number of patients treated annually, 1868 to 1922.*

Fiscal year.	Sick and disabled patients furnished relief.	Fiscal year.	Sick and disabled patients furnished relief.
Prior to reorganization:		After reorganization—Continued.	
1868.....	11,535	1895.....	52,643
1869.....	11,356	1896.....	53,804
1870.....	10,560	1897.....	54,477
After reorganization:		1898.....	52,709
1871.....	14,256	1899.....	55,489
1872.....	13,156	1900.....	56,355
1873.....	13,529	1901.....	58,381
1874.....	14,356	1902.....	56,310
1875.....	15,009	1903.....	58,573
1876.....	16,808	1904.....	58,556
1877.....	15,175	1905.....	57,013
1878.....	18,223	1906.....	54,363
1879.....	20,922	1907.....	55,129
1880.....	24,860	1908.....	54,301
1881.....	32,613	1909.....	53,704
1882.....	36,184	1910.....	51,443
1883.....	40,195	1911.....	52,209
1884.....	44,761	1912.....	51,078
1885.....	41,714	1913.....	50,604
1886.....	43,822	1914.....	53,226
1887.....	45,314	1915.....	55,782
1888.....	48,203	1916 ¹	68,398
1889.....	49,518	1917.....	64,022
1890.....	50,671	1918.....	71,806
1891.....	52,992	1919.....	93,719
1892.....	53,610	1920.....	389,943
1893.....	53,317	1921.....	812,176
1894.....	52,803	1922.....	396,012

¹ Includes patients treated at trachoma hospitals.

TABLE II.—*Transactions at United States Marine and United States Veterans' hospitals¹ and relief stations, fiscal year 1922.*

Location.	Total number of patients treated.	Total number treated in hospital.	Died.	Remaining in hospital June 30, 1922.	Number of days' relief in hospital.	Number of patients furnished office relief.	Number of times office relief was furnished.	Number of physical examinations.
FIRST-CLASS STATIONS.								
MARINE HOSPITALS.								
Grand total.....	396,012	107,405	1,930	3,180	5,481,524	288,607	649,228	260,601
2. Boston, Mass.....	5,683	1,005	19	131	38,239	4,678	9,524	1,073
3. Buffalo, N. Y.....	6,000	489	16	46	19,596	5,571	11,414	4,720
5. Chicago, Ill.....	4,755	856	12	118	38,665	3,929	18,112	3,769
6. Cleveland, Ohio.....	5,332	924	18	58	20,902	4,408	9,229	1,577
7. Detroit, Mich.....	5,534	991	18	77	38,877	4,543	10,783	9,966
8. Evansville, Ind.....	585	493	6	48	16,694	92	251	532
9. Fort Stanton, N. Mex.....	408	408	26	200	73,471	.....	.....	59
10. Key West, Fla.....	627	323	3	15	9,477	304	404	124
11. Louisville, Ky.....	1,324	685	12	50	16,429	639	3,187	651
12. Memphis, Tenn.....	1,947	934	9	32	23,278	1,013	1,864	2,778
13. Mobile, Ala.....	3,405	1,004	27	74	31,600	2,401	6,119	2,445
14. New Orleans, La.....	14,139	3,598	47	199	95,707	10,541	17,935	20,210
15. Pittsburgh, Pa.....	11,269	585	12	37	19,982	10,684	29,895	4,107
16. Portland, Me.....	982	567	3	40	13,093	415	478	757
17. Port Townsend, Wash.....	1,124	1,002	15	117	42,080	62	87	15
18. St. Louis, Mo.....	968	872	25	57	24,328	96	205	137
19. San Francisco, Calif.....	11,204	2,736	52	277	93,362	8,468	17,536	4,215
20. Savannah, Ga.....	5,503	970	26	76	32,720	4,533	10,818	2,730
21. Stapleton, N. Y.....	3,214	2,061	65	225	84,003	1,133	1,741	263
22. Vineyard Haven, Mass.....	248	123	7	8	5,116	125	150	15
43. Ellis Island, N. Y.....	10,571	10,506	88	214	133,966	65	98	3
66. Curville, La.....	204	204	6	167	44,538	.....	.....	.....
70. New York City, N. Y.....	73,962	773	6	24	8,498	73,189	73,189	25,054
82. Norfolk, Va.....	2,676	2,015	43	132	78,294	630	1,223	1,162
Total.....	171,754	34,215	561	2,422	1,003,725	137,539	224,245	86,362
UNITED STATES VETERANS' HOSPITALS.								
24. Palo Alto, Calif.....	1,602	1,545	34	27	145,065	57	72	1
25. Houston, Tex.....	3,806	3,806	48	13	213,740	.....	.....	743
26. Greenville, S. C.....	2,305	2,388	70	9	159,930	7	41	1,314
27. Alexandria, La.....	2,803	2,508	70	4	163,967	295	295	312
30. Chicago, Ill.....	18,251	4,145	47	8	153,380	11,106	75,933	13,020
Chicago, Ill. (annex).....	524	524	2	1	11,918	.....	.....	.....
32. Washington, D. C.....	10,871	1,309	28	2	62,410	9,562	25,037	23,318
34. East Norfolk, Mass.....	476	476	4	.....	36,639	.....	.....	.....

35. St. Louis, Mo.....	20,536	4,773	40	1	164,203	15,763	34,931	16,463
36. Boston, Mass.....	8,539	2,579	42	5	128,121	5,951	11,792	2,146
37. Waukesha, Wis.....	8,517	1,436	4	1	62,555	91	1,228	6,182
38. New York City, N. Y.....	22,511	1,119	22	1	50,518	21,392	93,677	4,419
39. New Haven, Conn.....	6,013	1,183	66	1	137,677	4,830	10,466	1,077
40. New Haven, Conn.....	1,479	484	4	1	96,061	435	1,077	591
41. West Roxbury, Mass.....	1,222	478	8	4	96,061	41	216	6
42. Baltimore, N. C.....	1,580	1,533	31	9	91,001	47	970	1,963
43. Atlanta, Ga.....	1,469	1,262	17	17	25,376	147	423	84
44. Philadelphia, Pa.....	1,017	809	58	3	121,119	208	535	1,265
45. Prescott, Ariz.....	1,637	1,637	11	11	197,160	2	4	66
46. Tucson, Ariz.....	984	592	40	11	67,777	392	508	661
47. Boise, Idaho.....	623	588	5	2	30,308	35	81	578
48. Dwight, Ill.....	478	467	6	11	38,036	11	138	7
49. Arrowhead Springs, Calif.....	401	375	7	4	43,679	29	67	3
50. Fort Bayard, N. Mex.....	2,302	2,218	66	22	308,705	81	100	274
51. Baltimore, Md.....	7,561	3,661	71	7	216,003	3,897	10,024	3,505
52. Knoxville, Iowa.....	253	252	10	1	51,775	1	3	3
53. New Orleans, La.....	368	340	1	1	12,943	28	120	460
54. Tacoma, Wash.....	751	674	18	12	78,131	77	762	330
55. Otten, N. C.....	3,077	2,883	106	14	276,702	194	318	194
56. Statou Island, N. Y.....	2,474	2,471	76	1	223,389	3	9	9
57. Augusta, Ga.....	452	432	3	1	69,427	20	49	24
58. Lako City, Fla.....	602	595	4	1	34,076	7	83	2
59. Camp Kearney, Calif.....	1,009	1,009	42	35	92,320	1,043	3,077	882
60. St. Paul, Minn.....	2,837	1,794	17	1	66,503	3,514	7,356	31
61. Kansas City, Mo.....	5,003	1,489	17	1	35,732	2,989	7,382	3,819
62. Minneapolis, Minn.....	5,394	2,405	31	1	83,967	121	2,044	46
63. Fort Thomas, Ky.....	478	337	6	1	29,531	10,546	152	158
64. Sterling Junction, Mass.....	203	203	10	1	38,729	146	1,903	32
65. Helena, Mont.....	607	607	1	1	9,920	18,161	244	1,579
66. Chicago, Ill.....	580	434	1	1	30,692	158,224	148	42
67. Gulfport, Miss.....	484	484	2	14	15,682	65	152	158
68. Colfax, Iowa.....	425	425	39	1	9,587	97	22,175	1,475
69. Maywood, Ill.....	2,136	2,311	9	1	22,175	1,073	10,319	23
70. Portland, Ore.....	177	506	11	1	10,319	12	23	238
71. North Little Rock, Ark.....	15	15	3	1	24,838	85,865	290,508	84,560
72. Dawson Springs, Ky.....	15	15	11	1	22,175	223,401	511,753	170,922
73. Fort Lyon, Colo.....	498	498	5	1	1,073	12	23	238
74. New York City, N. Y.....	151	455	5	1	10,319	85,865	290,508	84,560
75. Mobile, Ala.....	455	455	3	1	24,838	223,401	511,753	170,922
76. New Orleans, La.....	705	693	3	1	24,838	85,865	290,508	84,560
Total.....	148,908	63,043	1,210	2,237	4,292,538	223,401	511,753	170,922
Total (all first-class stations).....	320,662	97,258	1,771	2,659	5,236,263	223,401	511,753	170,922

¹ This table includes all relief furnished by the Public Health Service in United States Veterans' hospitals to May 1, 1922, on which date the operation, management, and control of this group of hospitals passed to the United States Veterans' Bureau in accordance with Executive order signed April 29, 1922.

² Public Health Service patients remaining on June 30.

TABLE II.—*Transactions at United States Marine and United States Veterans' hospitals and relief stations, fiscal year 1922—Continued.*

Location.	Total number of patients treated.	Total number treated in hospital.	Died.	Remaining in hospital June 30, 1922.	Number of days' relief in hospital.	Number of patients furnished office relief.	Number of times office relief was furnished.	Number of physical examinations.
SECOND, THIRD, AND FOURTH CLASS STATIONS.								
200. Albany, N. Y.	1,364	173	3	2	3,672	1,191	3,253	807
201. Apalachicola, Fla.	103	20			237	83	241	
202. Ashland, Wis.	51	11	1	4	208	40	74	
203. Ashtabula, Ohio.	185	24		1	465	161	320	232
204. Astoria, Oreg.	195	34			402	161	315	246
207. Bangor, Me.	17	2			101	15	24	55
208. Bay City, Mich.	165	21	1		277	144	286	184
209. Beaufort, N. C.	161	16			158	145	364	11
210. Bellingham, Wash.	332	11			168	321	576	303
213. Boothbay Harbor, Me.	65	9		1	124	56	81	37
215. Bridgeport, Conn.	1				4			
217. Brunswick, Ga.	67	20	1		259	47	78	172
219. Burlington, Iowa.	111	58		1	489	53	81	298
220. Cairo, Ill.	1,341	130	2	2	4,108	1,211	1,954	752
221. Cambridge, Md.	136	21	1	2	287	115	165	62
224. Charleston, S. C.	889	159	2	3	2,236	730	1,314	836
226. Cincinnati, Ohio.	321	58	3	2	911	263	525	47
229. Cordova, Alaska.	89	18		2	377	71	71	41
230. Crisfield, Md.	359	37		1	531	322	649	313
234. Duluth, Minn.	392	127	1	4	1,505	265	326	40
236. Eastport, Me.	7					7	26	10
237. Edenton, N. C.	22					22	26	10
238. Elizabeth City, N. C.	74					74	169	16
352. El Paso, Tex.	214	7		1	157	207	718	167
239. Erie, Pa.	263	57			512	206	400	24
240. Escanaba, Mich.	29	13	1		227	16	41	
241. Eureka, Calif.	309	64	1	1	732	245	357	133
243. Fernandina, Fla.	2					2	2	3
244. Gallipolis, Ohio.	145	46	1		601	99	168	103
245. Galveston, Tex.	3,552	658	11	47	11,968	2,894	5,296	778
246. Georgetown, S. C.	45	6		1	73	39	47	41
247. Gloucester, Mass.	223	5		1	70	218	602	637
248. Grand Haven, Mich.	102	5			26	97	184	93
249. Green Bay, Wis.	348	89	1		3,131	259	368	621
250. Gulfport, Miss.	72	12	1		270	60	81	117
251. Hancock, Mich.	68	9			46	59	90	140
252. Hartford, Conn.	5				161			
254. Honolulu, Hawaii	905	293	6	41	13,273	612	995	887
255. Hot Springs, Wash.	146	30	2	1	334	116	209	120
257. Irvington, Va.	4					4	5	11

255. Jacksonville, Fla.	550	119	2	1	1,731	431	1,184	168
260. Juneau, Alaska.	127	31	2	3	477	96	1,192	40
261. Kansas City, Mo.	749	92	1	.....	3,091	657	1,338	2,629
262. Kelchikan, Alaska.	183	46	1	.....	640	137	348	5
264. La Crosse, Wis.	501	119	2	.....	2,245	382	466	702
265. Lewes, Del.	93	2	.....	1	.....	91	377	17
346. Little Rock, Ark.	127	36	.....	.....	847	91	329	8,329
266. Los Angeles, Calif.	7,600	1,201	14	12	27,372	6,390	14,487	7,933
268. Ludington, Mich.	114	16	.....	.....	105	125	256	74
269. Machias, Me.	114	.....	.....	.....	.....	114	182	57
270. Manila, P. I.	2,276	522	11	4	22,501	1,751	2,104	1,101
271. Manistee, Mich.	103	10	1	.....	248	93	215	138
272. Manitowoc, Wis.	190	42	.....	.....	757	160	160	248
273. Marquette, Mich.	515	63	1	1	1,826	452	1,253	393
274. Marshfield, Oreg.	26	8	.....	.....	222	18	48	10
277. Menominee, Mich.	123	5	.....	.....	33	118	391	120
347. Miami, Fla.	2	.....	.....	.....	.....	.....	4	2
278. Milwaukee, Wis.	2,527	405	5	8	5,827	2,122	2,992	8,225
282. Nantucket, Mass.	51	.....	.....	.....	.....	51	104	13
283. Nashville, Tenn.	1,505	117	1	.....	1,184	1,388	2,169	5,370
284. Natchez, Miss.	78	1	.....	.....	11	77	147	135
285. New Bedford, Mass.	948	35	.....	1	844	913	965	1,183
286. New Bern, N. C.	273	129	3	2	2,276	144	209	23
288. New Haven, Conn.	7	2	.....	.....	9	5	8	40
289. New London, Conn.	228	78	1	2	1,559	150	139	366
291. Newport, Ark.	91	.....	.....	.....	.....	91	96	120
292. Newport, Oreg.	33	.....	.....	.....	.....	33	88	29
293. Newport, R. I.	148	26	.....	2	439	122	177	215
295. Nome, Alaska.	20	.....	.....	.....	.....	20	42	.....
296. Norfolk, Va.	2,689	378	.....	8	7,452	2,311	3,921	1,412
297. Ogdensburg, N. Y.	133	41	2	.....	7,297	92	144	610
298. Oswego, N. Y.	91	8	.....	.....	215	83	238	15
300. Paducah, Ky.	641	28	2	1	531	613	800	562
301. Panama Canal Zone.	695	453	6	9	7,806	242	312	249
302. Pensacola, Fla.	539	96	1	7	2,948	443	507	1,029
303. Perth Amboy, N. J.	193	15	4	1	401	178	240	149
304. Petersburg, Alaska.	52	.....	.....	.....	.....	52	155	13
305. Philadelphia, Pa.	4,388	599	8	33	10,152	3,879	9,832	1,778
307. Ponce, P. R.	42	10	1	.....	169	32	46	6
308. Port Angeles, Wash.	97	10	.....	.....	62	87	96	111
309. Port Arthur, Tex.	542	32	2	.....	196	510	820	2,260
310. Port Huron, Mich.	445	39	3	.....	594	406	1,017	2,527
312. Portland, Oreg.	3,577	402	6	3	9,729	3,175	6,803	8,229
356. Portsmouth, N. H.	4	2	.....	2	21	2	4	2
314. Providence, R. I.	2,317	82	1	7	2,945	2,235	6,087	2,177
315. Provincetown, Mass.	59	.....	.....	.....	.....	59	154	22
316. Richmond, Va.	638	103	.....	2	1,276	535	956	983
318. Rockland, Me.	138	7	.....	.....	123	131	288	56
320. Saginaw, Mich.	995	63	.....	.....	1,652	932	912	902
319. St. Thomas Virgin Islands.	96	13	.....	.....	225	83	142	111
354. Salem, Mass.	1	.....	.....	.....	.....	1	1	1
323. San Diego, Calif.	784	73	.....	3	3,141	711	1,237	3,666

TABLE II.—Transactions at United States Marine and United States Veterans' hospitals and relief stations, fiscal year, 1922—Continued.

Location.	Total number of patients treated.	Total number treated in hospital.	Died.	Remaining in hospital June 30, 1922.	Number of days' relief in hospital.	Number of patients furnished office relief.	Number of times office relief was furnished.	Number of physical examinations.
SECOND, THIRD, AND FOURTH CLASS STATIONS—Continued.								
324. Sandusky, Ohio.....	42	2	.....	1	44	40	86	53
326. San Juan, P. R.....	1,586	723	9	57	20,513	893	1,085	1,707
325. San Pedro, Calif.....	875	.....	.....	.....	.....	875	1,120	883
327. Saint Ste. Marie, Mich.....	178	56	2	5	600	122	352	292
329. Seattle, Wash.....	6,694	469	7	5	8,744	6,225	10,392	2,921
330. Seward, Alaska.....	25	1	.....	.....	8	24	62	.....
331. Sheboygan, Wis.....	118	13	.....	1	252	105	165	202
332. Solomons, Md.....	129	4	.....	.....	39	125	176	155
334. South Bend, Wash.....	53	14	.....	.....	212	39	128	14
335. Superior, Wis.....	255	39	.....	1	1,013	216	437	190
345. Tacoma, Wash.....	1,807	216	1	1	2,872	1,591	4,563	3,183
336. Tampa, Fla.....	1,243	127	1	4	4,392	1,116	1,312	952
337. Toledo, Ohio.....	611	107	3	7	1,617	504	751	282
357. Unalakaska, Alaska.....	12	2	.....	.....	182	10	11	.....
338. Vicksburg, Miss.....	409	96	2	4	1,665	313	676	164
339. Washington, D. C.....	647	5	.....	2	37	642	1,875	672
340. Washington, N. C.....	53	14	.....	.....	165	39	45	6
342. Wilmington, N. C.....	263	61	2	1	1,116	202	271	671
343. Wrangell, Alaska.....	35	1	1	.....	8	34	123	33
MISCELLANEOUS.								
Atlanta, Ga. (supply depot).....	27	1	.....	.....	25	26	95	21
Baltimore, Md. (Morrow Hospital).....	384	384	2	125	14,294	.....	.....	.....
Baltimore, Md. (out-patient office).....	247	.....	.....	.....	.....	217	322	110
Brooklyn, N. Y. (supply base).....	2,063	.....	.....	.....	.....	2,063	4,237	1,414
Cape Fear, N. C. (quarantine).....	121	.....	.....	.....	.....	121	216	50
Curia Bay, Md. (ordnance).....	5	.....	.....	.....	.....	5	12	6
Jefferson, Ind. (supply depot).....	15	.....	.....	.....	.....	15	50	.....
New Cumberland, Pa. (ordnance).....	18	.....	.....	.....	.....	18	22	17
New York, N. Y., East Nineteenth Street.....	1,063	.....	.....	.....	.....	1,063	6,014	.....
317. Rock Island, Ill. (arsenal).....	2,260	.....	.....	.....	.....	2,260	8,485	1,998
St. Elizabeth's Hospital, Washington, D. C.....	94	94	3	78	11,062	.....	.....	.....
South Ambury, N. J.....	11	.....	.....	.....	.....	11	35	.....
Coast Guard stations.....	1,443	.....	.....	.....	.....	1,443	4,458	245
Total.....	75,350	10,147	159	521	248,201	65,203	134,475	89,079
Grand total.....	396,012	107,405	1,930	3,180	5,484,524	288,607	649,228	260,401

TABLE III.—*Relief furnished at United States Marine and United States Veterans' hospitals,¹ and other relief stations, fiscal year 1922, according to beneficiary.*

Beneficiary.	Class of station.	Total number of patients treated.	Total number treated in hospital.	Died.	Remaining in hospital June 30, 1922.	Number of days' relief in hospital.	Number of patients of office relief.	Number of times office relief was furnished.	Number of physical examinations.
Grand total.	All.....	396,012	107,405	1,930	3,180	5,484,524	288,607	649,228	260,601
	First-class stations.....	203,847	68,133	1,218	462	4,239,648	135,714	343,397	105,440
	Other relief stations.....	33,300	4,274	64	68	124,377	29,026	50,408	56,547
American seamen.	Total.....	237,147	72,407	1,282	530	4,364,025	164,740	393,805	161,987
	First-class stations.....	58,425	11,012	359	1,444	585,676	47,413	69,566	27,530
	Other relief stations.....	24,636	4,230	86	366	93,986	20,406	40,704	10,710
Foreign seamen.	Total.....	83,061	15,242	445	1,810	679,662	67,819	110,270	38,240
	First-class stations.....	689	577	12	53	17,907	112	188	1,190
	Other relief stations.....	283	131	.....	6	1,899	152	327	2,039
United States Coast Guard.	Total.....	972	708	12	59	19,806	264	515	3,229
	First-class stations.....	4,629	1,207	6	92	38,930	3,422	4,966	1,969
	Other relief stations.....	3,769	362	1	22	5,213	3,407	8,699	1,943
United States Army.	Total.....	8,398	1,569	7	114	44,143	6,829	13,665	3,912
	First-class stations.....	214	66	2	2	1,198	148	190	143
	Other relief stations.....	258	5	.....	.....	25	253	389	47
United States Navy.	Total.....	472	71	2	2	1,223	401	579	190
	First-class stations.....	261	191	11	19	8,368	70	219	41
	Other relief stations.....	80	21	.....	4	329	59	123	22
Mississippi River Commission.	Total.....	341	212	11	23	8,697	129	342	63
	First-class stations.....	1,169	207	1	11	5,518	902	1,839	646
	Other relief stations.....	618	52	3	1	1,018	566	876	515
Engineers, United States Army.	Total.....	1,787	259	4	12	6,536	1,528	2,715	1,161
	First-class stations.....	239	147	3	24	7,770	92	204	77
	Other relief stations.....	628	122	1	3	2,051	506	956	166
Total.	Total.....	867	269	4	27	9,821	598	1,160	243

¹ See note (1) Table II.

TABLE III.—Relief furnished at United States Marine and United States Veterans' hospitals, and other relief stations, fiscal year 1922, according to beneficiary.—Continued.

Beneficiary.	Class of station.	Total number of patients treated.	Total number in hospital.	Died.	Remaining in hospital June 30, 1922.	Number of days' relief in hospital.	Number of patients furnished relief.	Number of times office relief was furnished.	Number of physical examinations.
Lighthouse Service.	First-class stations.	494	164	5	17	7,441	330	646	120
	Other relief stations.	643	69	2	5	1,416	574	933	264
	Total.	1,137	233	7	22	8,857	904	1,579	384
Coast and Geodetic Survey.	First-class stations.	127	38		1	1,247	89	151	122
	Other relief stations.	307	45		3	888	262	425	373
	Total.	434	83		4	2,135	351	576	495
Employees Compensation Commission.	First-class stations.	29,357	1,877	26	117	58,129	27,480	76,243	24,019
	Other relief stations.	7,511	395	2	33	8,259	7,116	19,547	4,723
	Total.	36,868	2,272	28	150	66,388	34,596	95,790	28,742
Discharged allied soldiers.	First-class stations.	1,562	677	8	13	48,137	915	1,816	496
	Other relief stations.	220	46		2	1,247	174	406	511
	Total.	1,812	723	8	15	49,384	1,089	2,222	1,007
Immigration Service.	First-class stations.	10,503	10,459	89	194	134,877	44	48	97
	Other relief stations.	491	380		8	7,479	111	476	6,640
	Total.	10,994	10,839	89	202	142,356	155	524	6,737
United States Public Health Service employees.	First-class stations.	4,803	2,272	24	48	37,626	2,531	5,334	2,216
	Other relief stations.	474	13			61	461	575	952
	Total.	5,277	2,285	24	48	37,687	2,992	5,909	3,168
Miscellaneous.	First-class stations.	4,313	231	7	162	43,791	4,082	9,946	6,816
	Other relief stations.	2,132	2			13	2,130	9,631	4,227
	Total.	6,445	233	7	162	43,804	6,212	19,577	11,043
Grand total.	First-class stations.	329,062	97,258	1,771	2,659	5,236,263	223,404	514,753	170,922
	Other relief stations.	75,350	10,147	159	521	248,261	65,203	134,475	89,679
	Total.	396,012	107,405	1,930	3,180	5,484,524	288,607	649,228	260,601

TABLE IV.—Total number of hospital relief days furnished by the United States Public Health Service to each class of beneficiaries, by months, during the fiscal year 1922.

Beneficiaries.	July.	August.	Septem-ber.	October.	Novem-ber.	Decem-ber.	January.	Febru-ary.	March.	April.	May.	June.	Total.
United States Veterans' Bureau.....	424,872	441,910	430,158	447,402	431,480	435,098	445,854	410,993	452,758	398,809	24,320	20,281	4,364,025
American seamen.....	35,644	53,847	53,227	54,408	54,026	57,913	61,991	59,909	61,803	54,739	56,557	54,938	679,662
Foreign seamen.....	1,569	1,573	1,619	1,975	1,814	1,547	1,645	1,477	1,782	1,679	1,633	1,493	19,806
United States Coast Guard.....	3,516	3,638	3,713	3,943	3,615	3,526	3,800	3,992	4,105	3,338	3,316	3,641	44,143
United States Army.....	75	58	120	265	98	101	51	80	113	106	55	101	1,223
United States Navy.....	741	776	597	626	704	1,037	955	675	908	614	722	642	8,697
Mississippi River Commission.....	394	504	528	687	612	765	680	475	482	322	405	499	6,536
Engineers, United States Army.....	682	585	501	597	612	808	1,216	1,148	1,001	804	882	925	9,921
Lighthouse Service.....	675	566	489	537	537	772	854	770	877	976	919	780	8,857
Coast and Geodetic Survey.....	76	176	79	51	155	191	185	258	332	292	209	131	2,135
Employees Compensation Commission.....	5,674	5,026	5,056	5,537	6,022	5,697	6,514	5,002	5,627	5,322	5,267	4,124	66,388
Disabled allied soldiers.....	4,505	4,621	4,653	5,011	5,128	5,380	5,641	5,000	4,792	3,977	3,413	3,663	49,384
Immigration Service.....	18,385	16,991	15,139	15,568	13,908	13,360	11,660	8,717	8,025	7,005	6,913	6,685	142,356
United States Public Health Service em- ployees.....	2,776	3,228	2,799	3,072	3,316	3,054	3,932	4,186	4,043	3,129	2,452	1,700	37,687
Miscellaneous.....	3,457	3,513	3,420	3,477	3,321	3,298	3,078	2,692	3,229	4,481	5,007	4,801	43,804
Total.....	523,041	537,912	522,098	543,326	526,230	532,577	548,062	505,974	549,577	485,593	108,970	101,164	5,484,524

TABLE V.—Total number of out-patient treatments furnished by the United States Public Health Service to each class of beneficiaries, by months, during the fiscal year 1922.

Beneficiaries.	July.	August.	Septem-ber.	October.	Novem-ber.	Decem-ber.	January.	Febru-ary.	March.	April.	May.	June.	Total.
United States Veterans' Bureau.....	49,672	44,593	45,662	44,055	44,058	38,565	41,514	25,553	22,779	18,474	10,218	8,662	393,805
American seamen.....	9,740	10,259	10,976	8,181	7,549	8,452	8,949	8,326	9,916	8,712	9,170	10,040	110,270
Foreign seamen.....	30	37	128	100	50	41	60	11	25	10	16	16	515
United States Coast Guard.....	957	1,130	916	994	971	1,052	1,200	1,515	1,697	1,014	1,194	1,025	13,665
United States Army.....	53	54	70	43	33	41	40	42	54	33	72	44	579
United States Navy.....	22	34	22	16	28	38	36	36	31	16	33	30	342
Mississippi River Commission.....	321	314	407	171	164	218	227	148	140	203	166	236	2,715
Engineers, United States Army.....	66	141	118	84	60	94	132	100	107	111	65	82	1,180
Lighthouse Service.....	81	100	112	106	111	109	127	175	232	147	117	162	1,579
Coast and Geodetic Survey.....	41	40	28	49	56	74	43	38	74	27	31	97	576
Employees Compensation Commission.....	6,043	6,460	6,289	6,592	6,981	7,575	6,743	7,323	9,423	10,419	10,979	10,763	95,790
Disabled allied soldiers.....	278	222	266	227	243	226	206	144	129	132	88	61	2,222
Immigration Service.....	4	4	6	6	.....	11	112	83	92	79	75	62	354
United States Public Health Service em- ployees.....	335	351	419	497	370	481	650	495	591	555	739	426	5,909
Miscellaneous.....	3,915	2,912	3,234	3,394	2,384	1,531	374	664	410	113	132	514	19,577
Total.....	71,554	66,651	68,647	64,515	63,054	58,490	60,413	44,553	45,700	40,045	33,086	32,220	649,228

TABLE VI.—Total number of physical examinations furnished by the United States Public Health Service to each class of beneficiaries, by months, during the fiscal year 1922.

Beneficiaries.	July.	August.	Septem-ber.	October.	Novem-ber.	Decem-ber.	January.	Febru-ary.	March.	April.	May.	June.	Total.
United States Veterans' Bureau.....	22,152	23,091	21,445	23,032	23,408	14,025	11,482	5,883	4,957	4,582	2,632	2,315	161,987
American seamen.....	3,190	3,481	2,940	3,270	2,805	2,849	3,067	2,998	3,342	2,922	3,518	3,538	38,240
Foreign seamen.....	266	309	392	256	247	303	158	150	187	132	405	231	3,229
United States Coast Guard.....	265	403	352	356	338	366	268	266	278	411	309	300	3,912
United States Army.....	63	3	2	6	2	.....	1	1	17	25	30	40	190
United States Navy.....	3	8	6	2	11	4	9	7	2	5	.....	6	63
Mississippi River Commission.....	29	58	99	118	92	116	155	113	83	95	85	118	1,161
Engineers, United States Army.....	15	23	22	21	21	16	23	14	16	19	29	24	243
Lighthouse Service.....	30	30	22	30	21	24	31	33	45	33	50	35	384
Coast and Geodetic Survey.....	24	20	22	19	29	36	27	32	91	46	69	80	495
Employees, Compensation Commission.....	1,795	1,761	1,561	1,595	1,682	3,817	1,986	1,779	2,268	3,125	3,592	3,781	28,742
Discharged allied soldiers.....	137	102	145	154	128	105	71	38	36	24	30	37	1,007
Immigration Service.....	461	195	634	509	632	762	475	654	614	578	328	565	6,737
United States Public Health Service, em- ployees.....	252	290	595	310	250	251	375	168	231	163	175	105	3,168
Miscellaneous.....	1,807	1,314	724	585	611	929	987	567	839	677	1,231	1,242	11,043
Total.....	29,989	31,391	28,961	30,263	30,467	23,606	22,115	12,703	13,046	12,837	12,483	12,740	200,601

TABLE VII.—*Number of United States Veterans' Bureau and other beneficiaries admitted, discharged, and died each month and the number remaining at the end of each month—Service¹ and contract hospitals, United States Public Health Service—Fiscal year 1922.*

Month.	Admitted.		Discharged.		Died.		Remaining.	
	United States Veterans' Bureau.	Others.	United States Veterans' Bureau.	Others.	United States Veterans' Bureau.	Others.	United States Veterans' Bureau.	Others.
1921.								
July.....	6,729	3,025	6,079	3,170	101	59	14,017	3,012
August.....	7,519	3,182	7,036	3,214	119	51	11,361	2,959
September.....	6,773	2,936	6,660	2,811	109	41	14,365	3,013
October.....	6,162	2,890	5,939	2,915	121	50	11,467	2,917
November.....	5,736	2,862	5,689	2,695	112	51	11,392	3,060
December.....	4,689	2,616	5,151	2,131	119	50	13,811	3,195
1922.								
January.....	5,582	2,627	4,180	2,456	128	67	11,785	3,299
February.....	4,722	2,433	4,720	2,449	142	70	14,645	3,213
March.....	5,495	2,516	6,125	2,637	158	67	13,837	3,025
April.....	4,347	2,097	6,444	2,273	150	53	12,927	2,796
May.....	4,629	2,406	12,813	2,487	10	42	733	2,673
June.....	465	2,297	12,813	2,246	13	41	550	2,650
Total.....	58,838	31,866	70,491	31,814	1,282	618	2,530	2,650
								2,310

² Remaining at end of fiscal year.¹ See note (1) Table II.

TABLE VIII.—Relief furnished by the Public Health Service to United States Veterans' Bureau and "other" beneficiaries, March, 1919, to June, 1922, inclusive.

	Hospital relief days.			Out-patient treatments.			Physical examinations.		
	United States Veterans' Bureau.	Others.	Total.	United States Veterans' Bureau.	Others.	Total.	United States Veterans' Bureau.	Others.	Total.
1919.									
March to June.....	47,982	233,300	281,282	6,371	32,700	39,071	9,616	10,300	19,916
1919-20.									
July to June (total fiscal year 1920).....	3,349,415	801,923	4,151,338	449,885	199,339	649,224	356,652	52,523	409,175
1920-21.									
July to June (total fiscal year 1921).....	6,612,576	1,159,095	7,771,671	1,123,904	349,158	1,473,062	883,912	120,639	1,004,551
1921.									
July.....	424,872	98,169	523,041	49,672	21,882	71,554	22,152	7,837	29,989
August.....	441,910	96,062	537,972	44,363	22,038	66,401	23,694	8,267	31,961
September.....	430,158	91,940	522,098	45,062	22,985	68,047	21,445	7,516	28,961
October.....	417,492	95,834	513,326	44,655	20,460	65,115	23,032	7,231	30,263
November.....	431,480	94,750	526,230	44,658	18,996	63,654	23,498	7,059	30,467
December.....	435,098	97,479	532,577	38,565	19,925	58,490	14,025	9,581	23,606
1922.									
January.....	445,854	102,208	548,062	41,514	18,899	60,413	14,482	7,633	22,115
February.....	410,993	94,981	505,974	25,553	19,300	44,853	5,883	6,820	12,703
March.....	452,758	96,819	549,577	22,779	22,021	45,700	4,937	8,169	13,046
April.....	398,809	86,754	485,563	18,474	21,571	40,045	4,582	8,255	12,837
May.....	24,320	84,650	108,970	10,218	27,868	38,086	2,632	9,851	12,483
June.....	20,281	80,883	101,164	8,662	23,558	32,220	2,315	10,425	12,740
Total ¹ (fiscal year 1922).....	4,364,025	1,120,499	5,484,524	393,805	255,423	649,228	161,987	98,614	260,601
Grand total (40 months).....	14,373,998	3,314,817	17,688,815	1,973,965	836,620	2,810,585	1,412,167	282,076	1,694,243

¹ See note (1) Table II.

DIVISION OF PERSONNEL AND ACCOUNTS.

In charge of Asst. Surg. Gen. J. W. KERR.

The personnel of the Public Health Service, both in the field and in the bureau, has been materially reduced by the transfer of activities relating to the medical treatment and hospital care of veterans of the World War. The creation of the United States Veterans' Bureau as a central organization for the administration of all phases of Federal assistance to ex-service men was provided for in the act approved August 9, 1921.

In accordance with the provisions and purposes of this act, all dispensaries, out-patient offices, and dental clinics which had been established by the Public Health Service for the treatment of veterans were transferred to the Veterans' Bureau on February 1, 1922, and all personnel engaged in this work other than commissioned medical and dental officers were transferred to the rolls of that bureau.

On May 1, 1922, a further transfer to the Veterans' Bureau of all hospitals which had been established for the care of ex-service men was effected by Executive order. This transfer also included the purveying depot at Perryville, Md., and provided for the transfer of certain hospitals at which construction work was in progress as soon as such work might be completed. These hospitals included many of the largest stations of the service, which had been established during the period immediately following the war when the need for hospital facilities was most pressing.

The Executive order directing the transfer of veterans' hospitals provided for transfer to the Veterans' Bureau of all employees other than commissioned officers of the Public Health Service engaged in the work. Provision was made for the detail of such officers, who retain their status as commissioned officers of the Public Health Service, and who are subject to change of station or other assignment whenever the Director of the Veterans' Bureau may so request.

The act approved June 10, 1922, entitled "An act to readjust the pay and allowances of the commissioned and enlisted personnel of the Army, Navy, Marine Corps, Coast Guard, Coast and Geodetic Survey, and Public Health Service," provided for all commissioned officers of the services named equal rates of pay and allowances. Mileage allowances for officers traveling under competent orders were also provided. These changes in the law necessitated changes in the methods of computing pay and allowances, together with new forms of pay vouchers.

On March 31, 1922, the President approved an amendment to the service regulations fixing the rates of pay for pharmacists, administrative assistants, nurses, dietitians, and reconstruction aids throughout the service. This amendment, known as amendment No. 3, superseded a previous amendment to the regulations of 1920 which had been temporarily in effect from July 1, 1921, until April 1, 1922.

In the section of finance and accounts a system of allotments and incumbrance statements has been installed during the year which will, it is believed, provide a much more accurate check on expenditures from appropriations than has heretofore been possible. Steps have also been taken to classify all objects of expenditure during the coming fiscal year in accordance with the methods prescribed by the Bureau of the Budget and the General Accounting Office.

The work of the finance and accounts section has been unusually heavy since the transfer of hospitals to the Veterans' Bureau on May 1. With a large part of the personnel transferred on that date, delay resulted in the settlement of bills incurred prior to that time because of limited clerical assistance. This work, however, will be current soon after the close of the fiscal year.

COMMISSIONED MEDICAL OFFICERS.

There has been little change in the total number of commissioned officers in the regular corps of the service during the year. Seven applicants for commission in the entrance grade of assistant surgeon successfully passed the prescribed examination. Three resignations and two deaths occurred during the year. No officers of the corps were placed on waiting orders.

On June 30, 1922, the regular corps consisted of the Surgeon General, 3 assistant surgeons general at large, 11 senior surgeons, 99 surgeons, 51 passed assistant surgeons, and 19 assistant surgeons. Seventeen other officers in the various grades are carried on waiting orders. One senior surgeon and 6 surgeons were detailed to the bureau as assistant surgeons general in charge of bureau divisions, in accordance with the acts of July 1, 1902, and July 9, 1918. One assistant surgeon general at large is in general charge of the enforcement in Europe of outgoing quarantine measures to prevent the introduction of communicable diseases into the United States, one is assigned as chief of the general inspection service, and one is engaged in hospital administration.

One surgeon is detailed as assistant to the Director, International Sanitary Bureau, Washington, D. C.; one surgeon detailed to the Department of Agriculture, in charge of the office of drug administration, Bureau of Chemistry; one passed assistant surgeon detailed as chief surgeon, Bureau of Mines, Department of the Interior; and one passed assistant surgeon detailed as medical director, United States Employees' Compensation Commission.

RESERVE CORPS.

With the growth of the number of beneficiaries under the war risk insurance act, the number of commissioned medical officers in the reserve corps of the Public Health Service gradually increased. It was only by the acquisition of additional officers under reserve commissions that the service was able to meet the demands made upon it in the administration of hospitals, dispensaries, and clinics devoted to the medical and dental care of ex-service men. At the beginning of the fiscal year 1922 the number of officers on active duty under reserve commissions was 966, and during the year this number was increased to 987, divided into the following grades:

2 assistant surgeons^{general}; 19 senior surgeons; 340 surgeons; 461 passed assistant surgeons; and 165 assistant surgeons.

With the transfer to the United States Veterans' Bureau of dispensaries and hospitals established for the care of veterans, all commissioned medical officers engaged in this work were detailed for duty under the director of that bureau. These officers retain their status as commissioned officers of the Public Health Service, and their transfer from station to station or assignment to new duties is made by the Public Health Service on request of the Director of the Veterans' Bureau. As will be seen from the accompanying table, the number of officers supplied the Veterans' Bureau by detail totals 884. A large majority of these medical officers served in the Army or Navy during the World War.

ATTENDING SPECIALISTS.

The number of attending specialists in the service decreased from 863 to 73 during the fiscal year. This decrease resulted from the transfer of hospitals and dispensaries to the Veterans' Bureau. The greater number were employed at the large hospitals which had been established for the purpose of caring for veterans, and with the transfer of these stations all personnel other than commissioned officers was transferred to the rolls of the Veterans' Bureau.

Of the 73 attending specialists now in the service, 65 are on duty at marine hospitals and 8 are employed in connection with the operation of second and third class relief stations.

ACTING ASSISTANT SURGEONS.

As was the case with attending specialists, the number of acting assistant surgeons transferred to the Veterans' Bureau formed a large proportion of the total on duty when the fiscal year began. On June 30, 1921, there were 1,679 acting assistant surgeons in the Public Health Service. On June 30, 1922, following the transfer of veterans' hospitals and dispensaries, this number had decreased to 445.

COLLABORATING EPIDEMIOLOGISTS.

The value of securing early and accurate reports of the prevalence of communicable diseases throughout the United States has been so well established that the appointment of collaborating epidemiologists and assistant collaborating epidemiologists has been extended during the year. Practically all of these employees are health officers or employees of State or local boards of health, who serve at nominal compensation, and who are in a position to furnish the service with reports of communicable disease as soon as received by State or local health organizations. In most cases their compensation is \$1 per annum. The cost of securing this important information is therefore very low. During the year the number of collaborating epidemiologists was increased from 36 to 41, and the number of assistant collaborating epidemiologists from 3,862 to 4,125.

HYGIENIC LABORATORY.

At the close of the fiscal year there were on duty in the Hygienic Laboratory, in addition to the director and assistant director, 3

chiefs of divisions, 4 surgeons, 11 passed assistant surgeons, 2 pharmacists, 3 technical assistants, 1 physiologist, 3 special experts, 2 pharmacologists, 1 assistant pharmacologist, 1 scientific assistant, 3 chemists, 2 assistant chemists, 2 junior chemists, 2 bacteriologists, 3 assistant bacteriologists, 2 bacteriological technicians, 1 artist, 15 other technical employees, and 65 attendants and other employees.

PHARMACISTS AND ADMINISTRATIVE ASSISTANTS.

At the close of the year there were 38 pharmacists and 26 administrative assistants in the service, the latter group having been appointed subsequent to July 1, 1920. The greatly decreased number of administrative assistants over the preceding fiscal year is accounted for by the transfer of veterans' hospitals to the United States Veterans' Bureau, together with personnel. None of the pharmacists were transferred to the Veterans' Bureau. Two members of the pharmacists corps died during the year and two were detailed as associate medical purveyors.

At the close of the fiscal year pharmacists and administrative assistants were classified as follows:

Pharmacists, first class.....	25
Pharmacists, second class.....	13
Administrative assistants, first class.....	6
Administrative assistants, second class.....	3
Administrative assistants, third class.....	12
Administrative assistants, fourth class.....	5

BOARDS CONVENED.

Ninety-two boards were convened at various stations throughout the United States for the physical examination of officers of the United States Coast Guard and applicants for entrance therein; 3 boards for the examination of aliens; 6 for reexamination of aliens; 1 for reexamination of an alien certified to be insane at time of arrival in Boston; 9 for examination of commissioned officers in the Public Health Service to determine their fitness for promotion; 13 for examination of applicants for appointment as assistant surgeon; 1 for the purpose of reclassifying administrative assistants in the Public Health Service; 1 to determine condition of United States Veterans' Hospital No. 38 prior to turning it over to owners; 4 for examination of surfmen for retirement; 3 for examination of associate sanitary engineers for promotion to class III, scientific personnel; 1 for the purpose of considering the standardization and keeping of uniform records of out-patients of the Public Health Service; 1 permanent board to examine applicants for appointment under the Public Health Service reserve act; 1 for the purpose of prescribing uniforms for student nurses; 1 to determine the eligibility of a commissioned officer of the service for waiting orders; 1 to examine pharmacists for promotion; 1 to examine certain supplies on hand in the purveying service; 1 to determine the conditions as to tuberculosis and neuro-psychiatry in old line employees; 1 to investigate fatalities occurring on British steamship *Haiti*; 1 to confer with officials of Polyclinic Hospital relative to property belonging to that hospital; 1 to investigate artificial ventilation

of vessels subsequent to fumigation with cyanide and to make studies as to utilization of gases other than hydrocyanic acid gas; 1 to make study of service regulations, paragraphs 67 and 70, with a view of determining advisability of amending same; 1 to consider uniform regulations of the Public Health Service; 1 to make necessary preparations for the government of a leprosarium.

Numerical distribution of personnel of Public Health Service by designation and activity as of June 30, 1922.

Activity.	Regular corps.	Reserve corps.	Acting assistant surgeons.	Attending specialists.	Internes.	Administrative assistants.	Pharmacists.	Scientific personnel.	All other employees.	Collaborating epidemiologists.	Total.
Divisions of bureau.....	12	2	.....	.....	.....	.....	2	.....	232	.....	248
Hospitals and dispensaries.....	37	78	71	65	20	18	19	.....	1,895	.....	2,203
Quarantine and immigration.....	50	.....	144	.....	.....	6	4	.....	648	.....	852
Veneral disease control.....	.....	.....	48	3	.....	.....	.....	.....	29	.....	80
Prevention of epidemics.....	6	3	43	.....	.....	.....	.....	11	131	4,166	4,360
Field investigations of public health.....	41	.....	21	.....	.....	.....	7	20	304	.....	393
Purveying service.....	1	.....	.....	.....	.....	2	2	.....	90	.....	95
Veterans' Bureau.....	19	884	.....	.....	.....	.....	.....	.....	.....	.....	903
Second and third class stations.....	8	8	101	8	.....	.....	4	.....	50	.....	179
United States Coast Guard.....	1	8	4	.....	.....	.....	.....	.....	.....	.....	13
Waiting orders.....	17	.....	.....	.....	.....	.....	.....	.....	.....	.....	17
Miscellaneous.....	10	4	.....	.....	.....	.....	.....	.....	.....	.....	14
Total.....	202	987	432	76	20	26	38	31	3,379	4,166	9,357

DIVISION OF VENEREAL DISEASES.

In charge of Asst. Surg. Gen. C. C. PIERCE.

Activities in the control of venereal diseases were continued along the lines of medical, educational, and law-enforcement measures during the fiscal year 1922.

Accurate data from which may be determined the causes for the fluctuation in the rate of infection with venereal diseases are not available. The decrease in the number of cases reported to State boards of health in 1922 can not be taken as an indication of an actual falling off in incidence, inasmuch as the change in the percentage of physicians who report their cases is not known. Opinions gathered from various sources show a growing belief that there are fewer new cases coming for treatment. At a conference of several of the leading venereal-disease control officers in May, the feeling was unanimously expressed that there is a decline in the infection rate. The State board of health in Mississippi reports that the percentage of physicians reporting has increased from 90 to 96 per cent in the years 1918-1921, but the total cases of venereal diseases reported are on the decrease. Replies to a questionnaire sent to college presidents show a general belief that the infection among college students has decreased. The June, 1922, issue of the Statistical Bulletin of the Metropolitan Life Insurance Co. made the statement that there has been a decline of 21 per cent in the mortality rate due to syphilis among industrial policyholders during the last four years, the figure for 1921 being 13.1 per 100,000 as compared with 16.6 in 1917. The Bulletin says further: "A careful examination of the figures for age indicates furthermore that the difference between the rates for 1917 and for 1921 is chiefly accounted for by the lowering of the rates in the age period between 25 and 55 years. We may venture the suggestion that this improvement in the early and middle years of life is the result of increasing effectiveness in the treatment of syphilis." In the absence of more reliable data, the division feels that judgment should be suspended. The trend of opinion as expressed above is, however, of interest.

FEDERAL AND STATE APPROPRIATIONS.

Although no Federal allotment was made to States in 1922, at the beginning of the year there was an unexpended balance of about \$272,000 available to the States from the 1921 allotment, so that the stimulation of State work was continued through the year. With the exception of the District of Columbia, all States qualified for part or all of their share of this allotment. A statement of the account of the \$546,345 allotted to States in 1921, as of June 30, 1922, follows:

Statement of the 1921 Federal allotments to States.

State.	Total allotment.	Amount qualified for.	Paid to States as of June 30, 1922.	Balance due States June 30, 1922.
United States.....	\$546,345.30	\$537,944.82	\$502,931.06	\$35,013.76
Alabama.....	12,700.97	12,700.97	12,700.97	.....
Arizona.....	1,213.93	1,213.93	1,079.74	134.19
Arkansas.....	9,352.75	9,352.75	9,150.35	202.40
California.....	14,123.42	14,123.42	14,123.42	.....
Colorado.....	4,746.46	4,746.46	4,746.46	.....
Connecticut.....	6,622.02	6,622.02	6,622.02	.....
Delaware.....	1,201.86	1,201.86	1,201.86	.....
District of Columbia.....	1,966.66	.....	.....	.....
Florida.....	4,470.80	4,470.80	4,470.80	.....
Georgia.....	15,499.03	15,499.03	15,499.03	.....
Idaho.....	1,934.13	1,934.13	1,934.13	.....
Illinois.....	33,495.07	33,307.76	33,307.76	.....
Indiana.....	16,044.09	16,044.09	13,285.58	2,758.51
Iowa.....	13,215.86	13,215.86	13,215.86	.....
Kansas.....	10,044.79	10,044.79	7,991.83	2,049.96
Kentucky.....	13,602.78	13,602.78	13,602.78	.....
Louisiana.....	9,839.49	9,839.49	9,839.49	.....
Maine.....	4,409.92	4,409.92	4,409.92	.....
Maryland.....	7,694.78	7,694.78	7,694.78	.....
Massachusetts.....	19,997.61	19,997.61	19,997.61	.....
Michigan.....	16,693.35	16,693.35	16,693.35	.....
Minnesota.....	12,330.39	12,330.39	12,330.39	.....
Mississippi.....	10,675.45	10,675.45	10,675.45	.....
Missouri.....	19,563.49	19,000.00	14,191.21	4,808.79
Montana.....	2,233.87	2,233.87	2,233.87	.....
Nebraska.....	7,082.14	7,082.14	7,082.14	.....
Nevada.....	486.36	486.36	486.36	.....
New Hampshire.....	2,557.74	2,557.74	2,557.74	.....
New Jersey.....	15,071.60	15,071.60	15,071.60	.....
New Mexico.....	1,944.28	1,944.00	1,021.27	922.73
New York.....	54,137.84	54,137.81	51,705.25	2,432.59
North Carolina.....	13,106.06	13,106.06	13,106.06	.....
North Dakota.....	3,427.90	3,427.90	3,427.90	.....
Ohio.....	28,318.26	28,318.26	22,537.90	5,780.36
Oklahoma.....	9,844.04	9,844.04	9,844.04	.....
Oregon.....	3,996.44	3,996.44	3,996.44	.....
Pennsylvania.....	45,533.26	45,533.26	35,852.33	9,680.93
Rhode Island.....	3,223.28	3,223.28	2,859.16	364.12
South Carolina.....	9,001.97	9,001.97	9,001.97	.....
South Dakota.....	3,468.48	3,468.48	3,468.48	.....
Tennessee.....	12,978.36	12,978.36	8,980.90	3,997.46
Texas.....	23,146.73	17,463.99	15,582.27	1,881.72
Utah.....	2,217.83	2,217.83	2,217.83	.....
Vermont.....	2,114.50	2,114.50	2,114.50	.....
Virginia.....	12,246.65	12,246.65	12,246.65	.....
Washington.....	6,783.79	6,783.79	6,783.79	.....
West Virginia.....	7,253.85	7,253.85	7,253.85	.....
Wisconsin.....	13,863.89	13,863.89	13,863.89	.....
Wyoming.....	867.08	867.08	867.08	.....

For the fiscal year 1923 Congress made an appropriation of \$400,000 to the division of venereal diseases, of which sum \$225,000 is to be allotted to State boards of health for cooperative work in the prevention and control of venereal diseases. The method of paying allotments to the several States, as provided by the Secretary of the Treasury in accordance with the decision of the Comptroller General, April 10, 1922, is to be as follows:

The statute requires that the allotment to each State shall be in the proportion which its population bears to the population of the continental United States, exclusive of Alaska and the Canal Zone, according to the last preceding United States census, the term "State" to be held to include the District of Columbia, such allotment to be conditioned upon appropriation of a like amount by the State for the prevention, control, and treatment of venereal diseases.

Upon qualification by a State, one-fourth of the amount due this State to be paid to the State treasurer by accounting officer's settlement upon certification by the Surgeon General of the Public Health Service to the effect that the State has qualified for its allotment in accordance with the provisions set forth in the preceding paragraph,

the remainder of the allotment due the State to be paid to the State treasurer in a similar manner at the beginning of each subsequent quarter of the fiscal year: *Provided*, That a State qualifying for its allotment, the amount of which is less than one thousand dollars for the fiscal year, shall receive the entire annual allotment, in one payment upon qualification and certification by the Surgeon General.¹

The following table gives the schedule of allotments to States of this sum of \$225,000, also the money appropriated or otherwise set aside by the individual States for work in venereal disease control, totaling over \$800,000. The growing independence of the States in this work is shown by the fact that the Federal allotment is only 27.8 per cent of the amount set aside by the States.

Federal allotments and State appropriations for the fiscal year 1923.

State.	Federal allotment.	State appropriations.	State.	Federal allotment.	State appropriations.
United States.....	\$225,000.00	\$809,414.87	Montana.....	\$1,168.28	\$4,645.00
Alabama.....	4,997.98	25,000.00	Nebraska.....	2,759.26	14,140.00
Arizona.....	711.25		Nevada.....	164.75	
Arkansas.....	3,729.48	12,500.00	New Hampshire.....	943.08	6,000.00
California ¹	7,293.91	25,800.00	New Jersey.....	6,717.18	20,000.00
Colorado.....	1,999.96	20,000.00	New York.....	22,104.46	40,380.00
Connecticut.....	2,938.61	10,000.00	New Mexico.....	766.99	
Delaware.....	474.65	2,500.00	North Carolina.....	5,446.97	5,446.97
District of Columbia.....	931.35		North Dakota.....	1,376.84	6,274.24
Florida.....	2,061.34		Ohio.....	12,258.59	25,000.00
Georgia.....	6,163.64	17,036.20	Oklahoma.....	4,317.10	15,000.00
Idaho.....	919.21		Oregon.....	1,667.41	6,000.00
Illinois ²	13,803.61	100,000.00	Pennsylvania.....	18,560.14	18,560.14
Indiana.....	6,237.19	42,300.00	Rhode Island.....	1,286.43	7,500.00
Iowa.....	5,116.84	25,000.00	South Carolina.....	3,583.73	3,583.73
Kansas.....	3,765.78	7,500.00	South Dakota.....	1,354.86	5,000.00
Kentucky.....	5,143.68	20,000.00	Tennessee.....	4,976.08	12,978.36
Louisiana.....	3,828.04	12,500.00	Texas.....	9,925.46	9,925.46
Maine.....	1,634.68	10,000.00	Utah.....	956.52	
Maryland.....	3,085.33	28,220.00	Vermont.....	750.13	4,000.00
Massachusetts.....	8,199.53	69,529.10	Virginia.....	4,914.99	7,641.36
Michigan.....	7,808.05	32,800.00	Washington ³	2,887.50	
Minnesota.....	5,080.88	30,000.00	West Virginia.....	3,115.42	10,000.00
Mississippi.....	3,811.24	16,000.00	Wisconsin.....	5,602.23	41,350.00
Missouri.....	7,245.37	16,304.31	Wyoming.....	413.78	3,000.00

¹ Appropriation for the biennium, \$51,600.

² Appropriation for the biennium, \$200,000.

³ No appropriation; an average of \$150 a month spent in venereal disease control work.

Of the States for which no report is included in the table above, Arizona made an appropriation of \$6,000 in 1921 for a period of two years for venereal disease control purposes; Idaho will have no State money available prior to the meeting of the legislature in January, 1923; New Mexico will have funds in December, 1922; and Utah made an appropriation of \$3,600 in 1921 for the biennium. The District of Columbia, Florida, and Nevada have no money available.

State boards or departments of health receiving their respective allotments shall agree to the following cooperative measures under which their appropriations shall be expended, according to the regulations promulgated by the Secretary of the Treasury, May 1, 1922:²

1. To have in operation, through a legislative enactment or a State board of health regulation having the effect of law, regulations in conformity with the suggestions approved by the Surgeon General of the Army, Navy, and United States Public

¹ Reprint from the Public Health Reports, vol. 37, No. 19, May 12, 1922, pp. 1143-1146. This sentence is an amendment to the regulations, approved by the Secretary of the Treasury, June 14, 1922.

² Reprint from the Public Health Reports, vol. 37, No. 19, May 12, 1922, pp. 1143-1146.

Health Service, for the prevention of venereal diseases. The minimum requirements of these rules are—

(a) Venereal diseases must be reported to the local health authorities in accordance with State regulations approved by the United States Public Health Service.

(b) Penalty to be imposed upon physicians or others required to report venereal infections for failure to do so.

(c) Cases to be investigated, so far as practicable, to discover and control sources of infection.

(d) The spread of venereal diseases should be declared unlawful.

(e) Provision to be made for control of infected persons who do not cooperate in protecting others from infection.

(f) The travel of venereally infected persons within the State to be controlled by State boards of health by definite regulations that will conform in general to the interstate quarantine regulations.

(g) Patients to be given a printed circular of instructions informing them of the necessity of measures to prevent the spread of infection and of the importance of continuing treatment.

2. A representative of the Public Health Service shall be assigned to each State receiving allotments, for the general purpose of cooperating with the State health officer in supervising the venereal control work in the State. This representative to be selected by the State health authorities and to be approved and recommended for appointment by the Surgeon General of the Public Health Service. The salary of this representative will be paid from State funds, except a nominal salary which will be paid by the United States Public Health Service. The general plan of work for the State bureau of venereal diseases will be:

(a) Securing reports of venereal infections from physicians and others required to report in accordance with State laws.

(b) Suppressive measures, including the isolation and treatment in detention hospitals of infected persons who are unable or unwilling to take measures to prevent themselves from becoming a menace to others; the establishment of free clinics for the treatment of venereal diseases; and the elimination of conditions favorable to the spread of venereal infection.

(c) Extension of facilities for early diagnosis and treatment through laboratory facilities for exact diagnosis and scientific determination of condition before release as non-infectious in accordance with recognized procedure.

(d) Educational measures to include informing the general public, as well as infected individuals, in regard to the nature and manner of spread of venereal diseases and the measures that should be taken to combat them.

(e) Cooperation with local civil authorities in their efforts to suppress public and clandestine prostitution. The clinics referred to under (b) will form centers from which the other measures may be conducted by discovering the presence of infections, the securing of data for enforcing the regulations for reporting these diseases, and the institution of educational measures appropriate to particular communities.

(f) Accurate detailed records must be kept of all the activities of the venereal disease work. These will include careful records of each case treated, amount of arsphenamine used, final results, and disposition made of patients. Copies of these records must be forwarded to the Surgeon General, United States Public Health Service, as a report, at such intervals as they may be requested, and in accordance with instructions regarding the form of report.

3. Local funds that may be available, or that may become available from legislative appropriations or any other source, for venereal disease control, shall be used by the State or city health authorities having jurisdiction, for the extension of the work, and such local funds must not be conserved through the expenditure of the funds that are allotted by the Congress through the United States Public Health Service.

4. In extension of the educational measures, the State's health authorities shall exert their efforts and influence for the organization of a State venereal disease control committee or other organization that will be unofficial in character, but a valuable cooperative agency for furthering the comprehensive plan for nation-wide venereal disease control.

5. The State health authorities shall take such measures as may be found practicable and decided upon in conference between the Public Health Service and State boards of health representatives for the purpose of securing such additional legislation as may be required to control the spread of venereal infections. Action shall be taken to limit or suppress the activities of advertising "specialists" and quacks by prosecuting them under State laws, or such other measures as may be applicable and effective.

6. In expending the sum allotted a State, protection from venereal diseases of the military and naval forces located within each particular State shall receive proper consideration.

7. The State allotment and the amount of State funds used to secure the allotment shall be expended along general standard lines by all States approximately as follows:

(a) For treatment of infected persons in hospitals, clinics, and other institutions, including arsphenamine and other drugs, 50 per cent of the allotment.

(b) In carrying out educational measures, 20 per cent.

(c) In carrying out repressive measures, 20 per cent.

(d) In general administration and other activities of venereal-disease control work, 10 per cent.

(This distribution is provisional and subject to modification after conference and agreement between each State and the United States Public Health Service to meet best the needs of the particular State.)

8. In carrying out the general venereal disease control program the administrative organization of the United States Public Health Service will be available at all times to State organizations in cooperative work, and assistance will be given to States whenever possible through the detail of employees, the securing of arsphenamine, providing sample literature for educational measures, and in other practicable ways.

DIVISION FINANCES AND PERSONNEL.

Of the \$200,000 appropriated to cover the expense of the division in 1922, \$20,000 was deducted by order of the Director of the Budget. Later a portion of this amount was used by the division, so that the total amount unexpended at the end of the year was approximately \$14,500. The amount appropriated for division expenses in 1923 was \$175,000.

MEDICAL MEASURES.

Medical activities on the whole have shown a slight decrease, although more clinics have reported their work to State boards of health and by their efforts have reached a larger number of patients. A number of communities, when Federal and State support had to be withdrawn, have financed their own clinics, showing a growing realization of the value of clinical medical service to the community. The most encouraging factor is the increase in the percentage of patients discharged from the clinics as probably noninfectious, because it indicates a better understanding by the patient of the need for continuing treatment.

CLINICS.

New clinics established.—At the close of the year, 542 clinics are in operation. During the year, 95 new clinics were established and 34 discontinued. A number of the clinics which have not received Federal aid have continued to report their activities and have been included in the tabulation which follows.

Clinic reports.—Reports from 541 clinics have been tabulated in 1922 as compared with 442 in 1921. The number of monthly reports per clinic received in 1922 is 9.9, as compared with 10.7 in 1921. The increase in the total number of reports tabulated in 1922 is 648, or 13.6 per cent.

New patients admitted to clinics in 1922 totaled 141,279, an increase of 531, or 0.38 per cent, over 1921. The average number of admissions per clinic, however, shows a decrease of 18 per cent. The following graph shows the decrease annually in yearly clinic attendance:

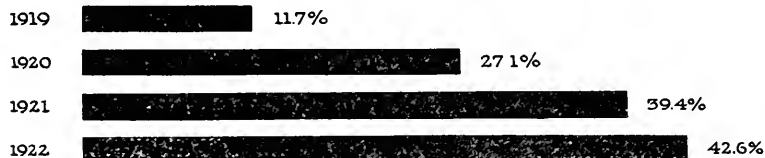
Clinic Attendance ~ Yearly Average



Of the total number of patients admitted to the clinics, 74,649 had syphilis, 60,954 gonorrhea, and 5,676 chancroid. Compared with the figures reported in 1921, syphilis shows an increase of 593 cases, chancroid an increase of 43, and gonorrhea a decrease of 105.

The number of persons discharged as noninfectious in 1922 was 60,169, an increase of 4,702, or 8.5 per cent, over 1921. The discharges per clinic for the year, however, decreased from 125 to 111. As mentioned above, the most encouraging aspect of the clinic work is the ratio between new patients admitted and those discharged as probably noninfectious. The following graph illustrates this:

Number of new patients admitted to clinics discharged as non-infectious



The percentages on the graph above have been computed upon the basis of new admissions to clinics without regard to the group of patients carried forward for treatment each year, from which a number of discharges were made. They are of value only as showing the relative increase from year to year.

Doses of arsphenamine administered in clinics in 1922 totaled 509,523, an increase of 28,872, or 6 per cent, for the year. Treatments for all venereal cases totaled 2,045,232, an average of 3,780 per clinic. Wassermann tests made totaled 298,486, and microscopic examinations for gonococcus infection 192,745.

Following is the tabulated report of the work of the clinics:

Reports of clinics, including those operating under the joint control of the Public Health Service and State boards of health, July 1, 1921-June 30, 1922.

State and city.	Total monthly reports received.	Patients admitted.				Patients discharged as non-infectious.	Treatments given.	Doses of arsphenamine given.	Wassermann tests made.	Microscopic examinations, gonococcus.
		Total.	Syphilis.	Gonorrhea.	Chancroid.					
United States.....	5,397	141,279	74,649	60,954	5,676	60,169	2,045,232	509,523	298,486	192,745
Alabama.....	145	9,619	6,028	3,309	282	5,524	81,520	32,649	12,513	3,988
Albany.....	6	37	34	3	.....	41	416	216	100	3
Anniston.....	1	20	6	10	4	17	.....	.....	2	10
Bessemer.....	12	1,068	975	76	17	494	3,519	2,068	1,824	243
Birmingham.....	12	2,558	1,587	896	75	1,295	26,980	11,983	6,168	1,092
Enfauila.....	12	308	139	133	16	343	3,800	1,076	219	810
Florence.....	5	57	23	33	1	35	1,187	221	98	99
Gadsden.....	12	161	58	94	9	97	1,986	485	113	120
Huntsville.....	12	289	118	167	4	286	3,380	1,128	1,046	207
Mobile.....	12	1,872	1,100	737	35	240	10,724	4,266	564	309
Montgomery.....	12	357	258	87	12	92	3,499	995	151	.....
Riderwood.....	12	50	30	19	1	21	510	244	52	.....
Selma.....	1	8	8	.....	.....	.....	31	24	3	.....
Talladega.....	12	266	81	151	34	462	3,118	374	133	96
Tuscaloosa.....	12	320	240	78	2	193	5,573	1,915	849	317
Cooperative.....	12	2,248	1,371	805	72	1,908	16,797	7,654	1,191	682
Arkansas.....	101	3,388	2,276	1,081	31	1,456	67,937	11,219	6,232	2,914
Fort Smith.....	12	87	47	39	1	5	398	224	59	4
Helena.....	7	166	97	68	1	87	1,038	265	121	70
Hot Springs (2).....	20	2,134	1,483	650	1	1,012	44,693	7,250	3,670	1,843
Little Rock.....	12	328	339	180	9	45	7,398	1,520	952	401
North Little Rock.....	12	78	73	5	.....	40	773	680	255	43
Pine Bluff.....	12	74	71	3	.....	45	467	306	55	6
Texarkana.....	10	205	80	108	17	194	12,529	423	228	493
Tucker.....	12	68	64	4	.....	25	135	478	859	.....
West Helena.....	4	48	22	24	2	3	506	73	33	50
California.....	118	4,163	2,344	1,767	52	1,031	52,503	13,828	14,799	3,791
Fresno (2).....	12	262	137	116	9	191	5,472	5,872	2,408	410
Los Angeles (3).....	31	2,313	1,216	1,076	21	319	21,508	5,857	3,768	1,804
Oakland.....	10	500	256	244	.....	11	4,178	1,593	1,712	199
Pasadena.....	2	27	27	.....	.....	.....	19	24	20	5
San Bernardino.....	9	58	30	28	.....	63	776	174	80	32
San Diego.....	8	84	54	30	.....	36	1,128	213	175	115
San Francisco (2).....	21	791	555	218	18	348	18,201	4,515	6,100	966
San Jose.....	10	38	25	12	1	45	880	292	338	35
Santa Barbara.....	6	13	13	.....	.....	.....	99	40	48	10
Stockton.....	9	77	31	43	3	18	239	248	150	215
Colorado.....	85	1,486	660	775	51	929	27,944	5,217	2,536	2,870
Buena Vista.....	12	59	32	26	1	68	788	314	102	11
Colorado Springs.....	12	25	21	4	.....	9	612	233	65	6
Denver (2).....	24	1,168	531	605	32	677	21,753	4,067	2,160	2,721
Fort Collins.....	12	29	7	22	.....	16	436	42	29	31
Leadville.....	12	16	1	12	3	7	733	21	13	60
Pueblo.....	12	183	64	104	15	152	3,607	532	167	41
Trinidad.....	1	6	4	2	.....	.....	15	8	.....	.....
Connecticut.....	72	1,046	467	549	30	729	22,560	4,485	2,434	1,978
Bridgeport.....	12	227	119	108	.....	78	9,268	1,392	368	254
Hartford.....	12	240	87	152	1	212	4,244	1,065	255	281
New Haven.....	12	150	72	78	.....	48	5,221	1,281	828	195
New London.....	12	28	25	3	.....	33	596	75	103	80
Stamford.....	12	324	122	176	26	334	1,789	352	816	1,138
Waterbury.....	12	77	42	32	3	24	1,442	320	64	30
Delaware.....	24	287	111	140	36	48	3,789	662	409	364
Dover.....	12	81	51	27	3	18	197	203	102	54
Wilmington.....	12	206	60	113	33	30	3,592	459	307	310

¹ Numbers in parentheses indicate the number of clinics included in the tabulation for the city.

Reports of clinics, including those operating under the joint control of the Public Health Service and State boards of health, July 1, 1921-June 30, 1922—Continued

State and city.	Total monthly reports received.	Patients admitted.				Patients discharged as non-infectious.	Treatments given.	Doses of arsphenamine given.	Wassermann tests made.	Microscopic examinations, gonococcus.
		Total.	Syphilis.	Gonorrhea.	Chancroid.					
District of Columbia	12	294	230	63	1	1	2, 132	1, 164	285	71
Washington.....	12	294	230	63	1	1	2, 132	1, 164	285	71
Florida.....	100	3, 600	2, 534	867	199	1, 530	15, 761	11, 006	5, 400	692
Alton.....	6	760	730	26	4	735	2, 193	2, 079	990	.....
Arcadia.....	2	13	7	4	2	10	283	79	37	21
Fort Pierce.....	8	58	38	17	3	25	363	135	82	33
Jacksonville (2).....	17	1, 968	1, 257	591	120	279	7, 734	6, 664	2, 837	78
Longbridge.....	7	63	49	13	1	55	531	386	101	.....
Mayo.....	3	1	1	.....	.....	28	93	88	33	1
Ocala.....	4	3	3	.....	.....	4	19	19	1	.....
Pensacola.....	6	45	45	.....	.....	5	166	115	42	.....
Perry.....	5	99	47	34	18	64	602	103	1	4
Sanford.....	9	46	22	12	12	20	337	106	18	10
Tampa.....	11	284	196	63	25	188	2, 703	884	863	310
Wauchula.....	11	88	30	53	5	100	195	87	90	145
West Palm Beach	11	172	109	54	9	17	542	261	305	90
Georgia.....	81	4, 075	2, 256	1, 586	233	954	38, 676	13, 333	7, 896	3, 330
Atlanta.....	12	1, 451	893	558	.....	.....	7, 668	4, 092	3, 359	.....
Augusta.....	12	176	71	96	9	.....	5, 190	916	1, 015	401
Branswick.....	12	140	133	7	.....	96	854	839	449	26
Columbus.....	12	619	266	264	89	135	7, 243	1, 453	1, 038	2, 775
Macon.....	12	786	489	233	64	303	9, 919	3, 809	1, 158	118
Rome.....	12	122	92	30	.....	65	657	421	173	.....
Savannah.....	9	781	312	398	71	335	7, 145	1, 803	704	10
Illinois.....	297	9, 152	3, 945	4, 896	311	3, 878	120, 911	29, 213	17, 221	12, 938
Alton.....	12	185	76	107	2	88	4, 228	394	263	288
Cairo.....	8	207	165	34	8	55	2, 241	1, 153	569	101
Carlinville.....	12	187	73	109	5	196	1, 810	430	484	1, 284
Chicago (13).....	134	7, 123	2, 951	3, 955	217	2, 698	85, 057	19, 715	13, 539	8, 128
Chicago Heights.....	12	30	16	14	.....	10	424	185	70	75
Decatur.....	12	114	80	34	.....	53	2, 879	1, 028	371	356
East St. Louis.....	12	280	135	138	7	160	5, 337	553	418	1, 069
Litchfield.....	12	82	19	62	1	33	2, 411	201	127	611
Moline.....	12	133	37	91	5	80	3, 315	1, 057	196	122
Peoria.....	12	192	101	74	17	67	2, 242	633	301	213
Princeton.....	5	8	7	1	.....	3	65	40	19	24
Quincy.....	6	71	32	38	1	19	1, 079	220	110	172
Rockford.....	12	89	34	52	3	54	1, 707	364	121	116
Rock Island.....	12	137	66	70	1	117	3, 675	1, 346	240	251
Springfield.....	12	188	135	49	4	67	3, 073	1, 774	316	115
West Hammond.....	12	126	18	68	40	178	1, 368	120	77	13
Indiana.....	216	4, 882	2, 250	2, 441	191	2, 019	122, 012	23, 985	10, 805	5, 641
Anderson.....	12	278	92	176	10	133	7, 922	713	808	836
Columbus.....	12	40	15	25	.....	12	765	111	46	44
Evansville.....	12	549	236	292	21	166	13, 235	2, 953	1, 162	600
Fort Wayne.....	12	427	148	275	4	236	9, 364	1, 911	1, 020	713
Hammond.....	12	254	78	137	39	199	6, 456	609	297	85
Indianapolis (2).....	24	1, 648	884	706	58	453	49, 186	6, 892	3, 434	1, 319
Jeffersonville.....	12	170	52	118	.....	127	1, 268	675	143	648
Kokomo.....	12	112	46	66	.....	38	1, 938	482	203	188
Madison.....	12	69	29	39	1	37	1, 430	200	59	21
Marion.....	12	83	27	52	4	17	1, 945	321	49	4
Michigan City.....	12	89	36	36	17	23	646	99	91	120
Muncie.....	12	137	65	72	.....	153	3, 293	1, 067	191	180
New Castle.....	12	72	57	14	1	33	438	337	516	81
Putnamville.....	12	141	29	88	24	50	4, 312	.....	.....	.....
Richmond.....	12	106	68	33	5	21	2, 153	948	410	58
South Bend.....	12	290	139	148	3	81	6, 683	1, 551	899	473
Terre Haute.....	12	417	249	164	4	240	10, 978	5, 116	1, 474	271
Iowa.....	119	1, 403	733	655	15	1, 077	23, 633	7, 654	3, 119	2, 360
Clinton.....	11	112	32	76	4	71	882	170	88	41
Council Bluffs.....	9	36	8	27	1	34	678	89	29	54
Davenport.....	12	221	123	98	.....	104	2, 861	1, 472	826	229
Des Moines.....	11	601	338	259	4	393	16, 352	2, 747	1, 377	1, 430

Reports of clinics, including those operating under the joint control of the Public Health Service and State boards of health, July 1, 1921-June 30, 1922—Continued.

State and city.	Total monthly reports received.	Patients admitted.				Pa- tients dis- charged as non- infectious.	Treat- ments given.	Doses of arsphe- namine given.	Wasser- mann tests made.	Micro- scopic exami- nations, gono- coccus.
		Total.	Syphi- lis.	Gonor- rhea.	Chan- roid.					
Iowa.—Continued.										
Dubuque.....	12	57	32	25	.....	61	917	498	250	163
Fort Dodge.....	9	13	3	8	2	1	201	76	6	9
Manly.....	10	2	.....	2	.....	2	29	.....	16	24
Marshalltown.....	12	23	8	15	.....	6	555	109	108	71
Mason City.....	10	14	10	4	.....	34	207	121	43	26
Ottumwa.....	1	1	1	.....	.....	6	.....	11	3	1
Sioux City.....	22	323	178	141	4	365	951	2,361	373	312
Kansas.....	98	1,852	1,112	733	7	915	67,188	8,174	3,035	3,782
Eldorado.....	12	277	96	181	.....	316	5,844	768	248	1,262
Junction City.....	12	8	1	7	.....	2	52	12	8	69
Kansas City (2).....	14	106	69	37	.....	37	1,402	397	176	117
Lansing.....	12	446	249	196	1	468	49,429	3,100	1,150	1,243
Lawrence.....	12	24	11	10	3	3	663	27	53	126
Rosedale.....	12	606	486	119	1	.....	3,872	1,966	815	37
Topeka.....	12	113	57	54	2	29	1,808	504	177	303
Wichita.....	12	272	143	129	.....	60	4,118	1,400	408	625
Kentucky.....	221	4,051	2,311	1,650	90	1,609	47,840	17,348	5,348	3,378
Ashland.....	12	231	130	100	1	312	6,899	3,129	505	1,839
Covington.....	12	118	59	55	4	10	2,117	290	151	107
Dayton.....	7	60	23	35	2	53	1,528	129	115	150
Frankfort.....	12	355	203	147	5	341	2,973	3,230	733	68
Fulton.....	8	72	29	40	3	59	.....	69	83	.....
Georgetown.....	12	60	40	15	5	46	1,026	262	194	61
Greenville.....	12	160	72	87	1	113	2,994	874	522	350
Harlan.....	12	105	78	27	.....	28	386	309	200	49
Henderson.....	12	46	46	.....	.....	7	1,118	437	247	2
Hickman.....	12	28	20	8	.....	7	219	171	42	11
Lexington.....	12	279	239	27	13	123	2,052	1,914	374	42
Louisville.....	12	1,894	946	905	43	146	17,613	3,246	804	307
Madisonville.....	12	56	29	27	.....	30	922	211	69	66
Maysville.....	12	20	13	7	.....	13	269	53	53	11
Middlesboro.....	9	89	69	20	.....	39	1,277	403	338	82
Mount Sterling.....	6	9	5	4	.....	8	90	20	9	18
Newport.....	5	64	19	40	5	46	2,271	117	88	99
Owensboro.....	12	129	94	34	1	70	1,953	1,212	306	90
Paducah.....	11	84	67	16	1	66	459	306	108	5
Pineville.....	7	95	71	23	1	.....	1,072	350	350	2
Winchester.....	12	97	59	33	5	92	602	616	57	19
Louisiana.....	73	4,587	2,465	1,842	280	2,011	60,154	14,640	5,168	2,061
Alexandria.....	12	514	207	290	17	312	23,048	1,329	624	835
Baton Rouge.....	7	86	43	31	12	24	785	98	1	167
Monroe.....	6	104	96	7	1	2	513	465	131	11
New Orleans (2).....	24	2,876	1,409	1,261	206	820	27,127	8,216	3,618	746
Shreveport (2).....	24	1,007	710	253	44	853	8,681	4,532	794	302
Maine.....	64	374	269	102	3	297	4,577	1,545	1,176	727
Bangor.....	12	145	114	31	.....	106	1,462	635	218	107
Bath.....	12	19	18	1	.....	.....	798	176	443	349
Calais.....	12	89	59	30	.....	116	467	125	390	1
Eastport.....	10	9	6	2	1	.....	185	82	19	1
Lewiston.....	2	12	7	5	.....	53	53	72	31	18
Portland.....	12	98	63	33	2	20	1,449	383	53	233
Sanford.....	4	2	2	.....	.....	2	163	72	22	18
Maryland.....	73	2,660	972	1,584	104	761	20,838	8,062	4,597	3,571
Annapolis.....	12	201	81	120	.....	187	1,683	428	223	210
Baltimore (3).....	20	1,941	642	1,215	84	349	10,790	5,928	3,710	2,899
Cambridge.....	12	107	67	38	2	43	1,234	324	94	58
Cumberland.....	12	224	88	132	4	125	5,235	714	265	255
Hagerstown (2).....	14	167	87	66	14	57	1,629	600	249	141
Kitzmiller.....	3	20	7	13	.....	.....	267	68	56	8
Massachusetts.....	320	6,567	3,615	2,936	16	1,733	133,578	42,361	20,816	18,092
Attleboro.....	11	23	11	12	.....	26	434	210	88	55
Boston (6).....	65	4,396	2,282	2,114	.....	914	75,605	28,744	13,182	15,686
Bridgewater.....	6	39	39	.....	.....	49	1,160	631	636	.....

Reports of clinics, including those operating under the joint control of the Public Health Service and State boards of health, July 1, 1921-June 30, 1922—Continued.

State and city.	Total monthly reports received.	Patients admitted.				Patients discharged as non-infectious.	Treatments given.	Doses of arsphenamine given.	Wassermann tests made.	Microscopic examinations, gonococcus.
		Total.	Syph- ilis.	Gonor- rhea.	Chan- roid.					
Massachusetts—Con.										
Brockton.....	12	60	47	13	.....	30	2,389	782	300	80
Fall River.....	12	161	68	86	7	5	5,359	473	242	421
Fitchburg.....	11	51	25	26	.....	31	915	270	92	74
Framingham.....	6	50	24	26	.....	21	12,144	203	131	110
Hathorne.....	6	44	43	1	.....	13	1,085	548	410	3
Haverhill.....	12	72	27	45	.....	6	1,180	269	52	25
Holyoke.....	11	46	33	13	.....	22	484	251	72	22
Lawrence.....	12	108	51	57	.....	41	1,844	508	229	.....
Lowell.....	12	222	131	91	.....	90	5,364	937	674	216
Lynn.....	12	122	63	59	.....	25	2,717	686	278	153
Medfield.....	4	6	6	.....	.....	.....	62	30	175	.....
Monson.....	3	13	13	.....	.....	.....	66	66	61	.....
New Bedford.....	12	304	224	80	.....	76	1,764	1,149	426	54
Northampton.....	2	3	3	.....	.....	.....	22	15	38	.....
North Grafton.....	6	2	2	.....	.....	5	304	18	16	.....
Pittsfield.....	12	11	3	8	.....	11	332	81	47	60
Rutland.....	4	13	13	.....	.....	5	10	6	153	.....
Salem.....	12	142	69	72	1	67	1,753	799	331	342
South Boston.....	12	50	50	.....	.....	47	943	662	246	.....
Springfield.....	12	174	77	90	7	7	4,088	1,247	296	23
Taunton.....	5	15	15	.....	.....	.....	62	224	300	2
Tewksbury.....	6	197	149	47	1	102	5,997	723	1,019	355
Westboro.....	12	54	50	4	.....	28	927	886	641	165
Worcester (3).....	30	189	97	92	.....	112	3,568	1,943	678	246
Michigan.....	222	6,416	3,330	3,072	44	2,361	138,175	18,944	21,774	27,703
Ann Arbor.....	9	295	293	.....	2	325	2,985	2,763	1,204	.....
Battle Creek.....	12	153	75	74	4	135	2,359	721	218	254
Bay City.....	12	41	5	36	.....	15	5	3	60	289
Detroit (3).....	36	4,813	2,418	2,391	4	757	110,389	10,975	16,869	24,617
Escanaba.....	12	126	33	77	16	160	3,749	642	87	7
Flint.....	12	131	60	71	.....	124	1,750	600	906	432
Grand Rapids.....	7	216	78	132	6	269	6,404	812	295	590
Ironwood.....	7	20	.....	20	2	13	267	.....	8	142
Ishpeming.....	12	20	5	15	.....	27	618	70	8	122
Jackson.....	12	122	84	34	4	203	2,145	836	433	267
Kalamazoo.....	12	83	39	41	3	72	941	240	151	180
Lansing.....	12	146	110	36	.....	89	1,270	389	902	151
Marquette.....	12	24	18	6	.....	14	440	114	88	87
Muskegon.....	12	66	22	42	2	78	886	125	93	131
Pontiac.....	12	85	53	32	.....	18	939	268	241	395
Port Huron.....	2	16	4	12	.....	.....	21	12	25	9
Saginaw.....	12	78	31	47	.....	60	2,953	346	88	207
St. Joseph.....	12	9	2	6	1	2	54	28	8	23
Minnesota.....	62	1,126	489	634	3	570	24,141	6,976	2,049	1,397
Duluth.....	12	407	121	286	.....	132	7,073	1,262	563	717
Minneapolis (3).....	26	438	212	226	.....	130	9,210	2,817	445	282
St. Paul (2).....	19	272	152	117	3	308	7,526	2,792	994	367
South St. Paul.....	5	9	4	5	.....	.....	332	105	47	31
Mississippi.....	62	2,686	1,669	819	198	1,724	14,886	6,691	2,833	2,150
Clarksdale.....	7	121	87	34	.....	59	608	420	230	69
Columbus.....	6	89	70	19	.....	8	661	553	195	4
Hattiesburg.....	9	268	144	113	11	73	2,042	566	578	531
Jackson.....	12	896	431	325	140	412	3,760	2,202	1,325	698
Laurel.....	12	839	572	230	37	916	2,622	1,134	.....	672
Meridian.....	12	428	320	98	10	256	5,144	1,749	494	176
New Albany.....	2	3	3	.....	.....	.....	7	2	7	.....
Tupelo ¹.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Vicksburg.....	2	42	42	.....	.....	.....	42	65	4	.....
Missouri.....	202	9,121	3,616	4,859	646	3,174	123,235	14,652	18,261	7,776
Hannibal.....	12	65	23	42	.....	57	1,300	224	77	110
Jefferson City.....	1	.....	.....	.....	.....	5	9	.....	8	16
Joplin.....	12	162	76	77	9	285	1,910	762	306	170
Kansas City (6).....	67	1,353	969	364	20	222	9,589	4,634	2,876	719
Sedalia.....	12	153	57	94	2	93	1,661	470	206	141
Springfield.....	12	331	144	177	10	191	5,586	875	447	235
St. Joseph.....	12	334	145	176	13	65	6,460	753	305	430
St. Louis (7).....	74	6,723	2,202	3,929	592	2,256	96,720	6,934	14,036	5,955

¹ Reports from Tupelo not tabulated.

Reports of clinics, including those operating under the joint control of the Public Health Service and State boards of health, July 1, 1921-June 30, 1922—Continued.

State and city.	Total monthly reports received.	Patients admitted.				Patients discharged as non-infections.	Treatments given.	Doses of arsphenamine given.	Wassermann tests made.	Microscopic examinations, gonococcus.
		Total.	Syph- ilis.	Gonor- rhea.	Chan- roid.					
Montana.....	23	63	27	36	.....	37	555	288	39	79
Billings.....	12	23	12	11	.....	.....	145	101	30	29
Great Falls.....	11	40	15	25	.....	37	410	187	9	50
Nebraska.....	84	1,262	593	560	109	332	28,508	5,495	3,597	3,657
Beatrice.....	6	7	1	6	.....	7	167	5	12	97
Fremont.....	12	33	4	27	2	35	392	31	26	49
Grand Island.....	6	16	3	13	.....	10	135	17	19	61
Hastings.....	12	27	10	17	.....	14	764	121	71	182
Lincoln.....	12	292	121	166	5	83	9,078	2,067	941	1,883
Omaha (2).....	24	873	451	321	101	175	17,266	3,126	2,515	1,346
Winnebago.....	12	14	3	10	1	8	706	128	13	39
New Hampshire.....	49	307	163	138	6	49	8,781	2,044	732	371
Concord.....	12	49	39	10	.....	6	535	492	98	21
Dover.....	11	20	12	8	.....	9	454	141	40	28
Manchester.....	12	159	70	88	1	28	6,970	827	378	281
Nashua.....	12	61	33	27	1	6	814	550	213	34
Portsmouth.....	2	18	9	5	4	.....	8	34	3	7
New Jersey.....	214	3,715	1,895	1,788	32	1,757	58,590	12,666	9,540	3,983
Atlantic City.....	12	341	206	135	.....	194	4,459	2,945	595	509
Bayonne.....	12	16	9	7	.....	11	186	158	30	9
Camden (2).....	23	373	205	167	1	53	5,268	1,388	2,144	186
Elizabeth.....	12	54	36	18	.....	.....	578	487	112	47
Greystone Park.....	5	9	9	.....	.....	3	139	131	105	7
Jersey City.....	12	376	189	183	4	53	8,281	964	2,510	1
Long Branch.....	12	128	99	29	.....	17	2,092	483	327	29
Montclair.....	11	28	24	4	.....	5	372	336	121	5
Morristown.....	3	5	4	1	.....	4	26	13	7	2
Mount Holly.....	11	8	8	.....	.....	2	48	34	17	2
Newark.....	12	1,745	712	1,024	9	1,215	24,601	1,766	1,977	2,859
New Brunswick.....	7	38	15	25	.....	15	65	165	47	28
Orange.....	12	80	53	26	1	32	1,991	1,162	426	6
Passaic.....	12	31	25	6	.....	4	646	216	115	23
Paterson (2).....	24	172	131	37	4	50	2,768	1,167	290	26
Plainfield.....	10	86	56	21	9	20	2,150	497	215	26
Salem.....	5	29	20	6	3	2	304	126	43	6
Trenton.....	12	176	84	91	1	75	4,431	864	471	177
Weehawken.....	7	20	12	8	.....	2	185	34	18	35
New Mexico.....	18	127	69	57	1	51	649	306	188	101
Albuquerque.....	11	109	59	49	1	48	592	273	151	71
Santa Fe.....	7	18	10	8	.....	3	57	33	37	30
New York.....	476	5,178	2,914	2,169	95	3,223	102,534	31,797	10,112	6,440
Albany (3).....	27	196	105	89	2	104	3,231	959	304	195
Amsterdam.....	12	37	15	22	.....	43	1,159	338	32	59
Beacon.....	5	6	6	.....	.....	6	24	20	.....	.....
Binghamton.....	12	81	65	16	.....	39	3,595	1,155	350	34
Buffalo (3).....	36	1,374	733	595	46	1,116	32,948	6,089	2,308	3,678
Cohoes.....	11	20	19	1	.....	3	207	112	12	.....
Corning.....	10	39	33	6	.....	55	556	266	.....	.....
Dunkirk.....	12	12	12	.....	.....	5	802	44	21	.....
Elmira.....	12	103	52	51	.....	77	2,072	847	157	52
Glens Falls.....	12	45	28	17	.....	28	1,800	542	118	43
Gloversville.....	12	32	25	7	.....	29	502	300	55	25
Hornell.....	12	37	30	7	.....	54	1,044	383	105	14
Ithaca.....	11	118	37	81	.....	109	1,989	533	117	395
Jamestown.....	12	72	42	30	.....	29	1,836	510	167	92
Kingston.....	6	8	7	1	.....	14	93	54	7	3
Little Falls.....	12	19	19	.....	.....	19	115	98	19	6
Middletown.....	12	55	54	1	.....	21	1,457	515	49	8
Newburgh.....	2	2	1	1	.....	.....	42	15	6	.....
New Rochelle.....	12	73	41	31	1	52	1,534	361	132	138
New York City.....	3	609	343	241	25	263	.....	3,178	1,042	228
Niagara Falls.....	12	114	79	31	4	157	2,307	926	351	191

Reports of clinics, including those operating under the joint control of the Public Health Service and State boards of health, July 1, 1921-June 30, 1922—Continued.

State and city.	Total monthly reports received.	Patients admitted.				Patients discharged as non-infections.	Treatments given.	Doses of arsphenamine given.	Wassermann tests made.	Microscopic examinations, gonococcus.
		Total.	Syphi-lis.	Gonor-rhea.	Chan-croid.					
New York—Contd.										
North Tona-wanda.....	12	16	11	5	.....	20	593	534	36	1
Olean.....	12	21	18	3	.....	19	265	148	11	3
Oswego.....	10	45	30	13	2	27	973	422	71	8
Plattsburg.....	12	36	27	9	.....	11	192	45	24	16
Port Chester.....	12	28	16	12	.....	69	1,103	270	85	40
Poughkeepsie.....	12	113	64	49	.....	69	1,357	402	183	76
Rochester (5).....	60	727	492	230	5	126	20,054	8,300	2,300	377
Rome.....	12	49	32	17	.....	12	1,269	505	158	35
Saratoga Springs.....	7	25	15	10	.....	12	293	112	30	53
Schenectady.....	12	104	52	51	1	77	2,316	352	187	74
Syracuse.....	12	517	195	322	.....	241	6,913	1,432	946	233
Troy.....	12	108	53	55	.....	44	1,581	428	151	69
Utica.....	12	172	84	84	4	187	3,769	922	243	91
White Plains.....	12	20	17	3	.....	10	366	143	35	1
Yonkers.....	12	145	62	78	5	48	4,177	537	300	202
North Carolina.....	86	1,894	1,210	581	103	905	13,919	8,530	3,512	833
Asheville.....	12	266	131	99	36	177	1,628	604	246	66
Charlotte.....	12	486	328	158	.....	1	7,694	3,973	1,905	269
Clinton.....	7	33	12	21	.....	31	146	43	17	17
Fayetteville.....	12	169	129	39	1	66	542	656	327	288
Goldsboro.....	1	16	14	2	.....	2	21	.....	11	2
Oxford.....	7	15	15	.....	.....	35	298	379	69	.....
Raleigh.....	11	155	130	25	.....	139	98	670	246	9
Wilmington.....	12	417	241	148	28	208	1,149	913	447	85
Winston-Salem.....	12	337	210	89	38	246	2,343	1,292	244	97
North Dakota.....	30	88	37	50	1	82	1,212	587	361	413
Fargo.....	7	36	18	18	.....	38	491	363	247	157
Grand Forks.....	11	17	5	11	1	24	259	52	56	39
Minot.....	12	35	14	21	.....	20	492	172	58	217
Ohio.....	368	11,093	5,691	4,865	537	3,544	153,514	29,051	21,588	13,961
Akron.....	12	929	352	529	48	731	19,023	2,894	2,305	2,743
Alliance.....	12	117	28	86	3	88	1,928	282	174	35
Athens.....	12	28	28	.....	.....	18	1,117	93	251	.....
Canton.....	12	101	100	1	.....	13	786	253	214	3
Chillicothe.....	12	13	11	2	.....	18	127	127	13	5
Cincinnati (3).....	26	1,411	734	356	321	91	9,152	3,128	2,402	434
Cleveland (9).....	69	4,755	2,563	2,119	73	1,039	57,761	9,637	7,544	3,311
Columbus (3).....	34	628	404	215	9	87	7,622	1,972	1,911	704
Dayton (4).....	37	522	340	182	.....	149	9,590	3,242	1,621	595
Delaware.....	5	38	22	16	.....	30	2,150	446	227	223
East Liverpool.....	6	113	33	80	.....	100	1,221	261	85	102
Hamilton.....	11	60	31	29	.....	13	393	215	80	90
Fronton.....	7	75	53	22	.....	112	2,054	514	524	189
Lima (2).....	24	137	84	53	.....	37	3,158	653	309	133
Massillon (2).....	12	111	111	.....	.....	29	288	576	330	1
Port Clinton.....	10	9	9	.....	.....	.....	36	35	224	4
Portsmouth.....	12	270	77	147	46	235	3,346	433	234	56
Springfield (2).....	24	259	89	164	6	185	1,695	309	186	502
Toledo.....	12	1,280	491	758	31	502	26,752	2,623	2,350	4,439
Youngstown (2).....	19	237	131	106	.....	67	5,315	1,358	604	392
Oklahoma.....	46	935	559	323	53	686	7,076	2,950	1,163	906
Bartlesville.....	11	217	137	79	1	137	3,804	1,002	188	99
Chicasha.....	11	292	148	105	39	268	1,970	1,551	421	298
Muskogee.....	12	136	65	59	12	58	1,073	379	100	77
Sulphur.....	2	5	3	2	.....	1	24	12	.....	.....
Tulsa.....	10	285	206	78	1	222	205	6	454	432
Oregon.....	12	554	316	233	5	79	4,069	727	1,103	821
Portland.....	12	554	316	233	5	79	4,069	727	1,103	821

Reports of clinics, including those operating under the joint control of the Public Health Service and State boards of health, July 1, 1921-June 30, 1922—Continued.

State and city.	Total monthly reports received.	Patients admitted.				Patients discharged as non-infectious.	Treatments given.	Doses of arsphenamine given.	Wassermann tests made.	Microscopic examinations, gonococcus.
		Total.	Syphilis.	Gonorrhea.	Chancroid.					
Pennsylvania.....	463	5,910	3,123	2,708	79	1,637	84,329	25,692	14,631	5,012
Allentown.....	12	410	246	161	3	406	3,383	1,835	1,005	350
Altoona.....	12	134	50	82	2	31	2,232	280	119	112
Beaver Falls.....	2	9	8	1	.....	.....	21	8	3	10
Bethlehem.....	12	114	100	12	2	12	1,483	1,073	315	93
Butler.....	12	54	26	25	3	22	1,104	179	137	39
Carlisle.....	7	27	22	7	.....	1	236	187	41	27
Chester.....	12	154	72	79	3	64	1,489	519	214	131
Clearfield.....	12	47	28	18	1	5	707	307	146	29
Coatesville.....	11	69	44	23	2	34	1,195	429	283	55
Du Bois.....	6	27	18	9	.....	2	1,050	460	168	29
Easton.....	12	84	37	46	1	63	1,642	307	365	73
Erie.....	12	388	209	174	5	69	4,730	1,656	788	332
Greensburg.....	12	172	142	30	.....	8	2,955	836	1,140	164
Harrisburg.....	12	59	41	16	2	1	532	178	65	22
Hazleton.....	12	77	19	56	2	17	880	137	151	64
Johnstown.....	12	124	62	59	3	20	1,199	484	206	83
Lancaster (2).....	24	133	114	19	.....	10	2,017	403	411	111
Lebanon.....	12	66	34	32	.....	.....	710	264	124	50
McKeesport.....	4	35	22	13	.....	2	481	64	64	35
Mifflintown.....	4	13	9	4	.....	3	38	36	13	13
Monessen.....	5	47	42	5	.....	6	367	62	109	47
New Castle.....	12	74	55	18	1	74	471	214	147	50
New Kensington (2).....	7	102	44	58	.....	4	560	266	172	98
Oil City.....	5	8	.....	7	1	3	120	12	6	6
Philadelphia (3).....	27	729	320	403	6	98	11,024	3,307	2,327	729
Phillipsburg.....	12	27	27	.....	.....	23	185	211	103	2
Pittsburgh.....	12	942	537	390	15	10	9,955	3,090	1,330	673
Pittston.....	6	15	8	7	.....	5	110	.....	29	12
Pottsville.....	12	81	69	12	.....	3	368	249	113	55
Punxsutawney.....	6	33	17	16	.....	11	1,383	481	200	33
Reading (2).....	23	277	120	155	2	86	5,178	784	648	258
Rochester.....	4	13	11	2	.....	.....	59	25	11	13
Sayre.....	3	17	16	1	.....	4	48	80	45	4
Scranton.....	12	356	149	194	13	201	7,469	1,615	1,055	327
Shamokin.....	12	45	15	30	.....	6	1,319	406	142	37
Stroudsburg.....	12	36	5	29	2	12	368	57	31	33
Sunbury.....	12	73	41	32	.....	41	1,400	333	165	62
Tunkhannock.....	5	2	2	.....	.....	.....	27	23	4	2
Washington.....	12	160	72	86	2	59	1,972	161	120	145
West Chester.....	6	15	14	1	.....	1	95	42	72	15
West Grove.....	2	.....	.....	.....	.....	.....	7	7	1	.....
Wilkes-Barre (2).....	24	540	166	366	8	132	12,244	3,730	1,764	485
Williamsport.....	12	60	49	11	.....	78	886	603	197	40
York.....	6	62	41	21	.....	10	600	292	82	64
Rhode Island.....	76	844	460	379	5	161	13,285	6,637	4,767	1,853
Arctic.....	12	4	3	1	.....	11	111	132	11	1
Newport.....	12	38	30	8	.....	17	263	291	44	9
Pawtucket.....	12	90	46	44	.....	21	1,659	470	166	84
Providence (3).....	36	709	378	326	5	108	11,180	5,715	4,540	1,759
Woonsocket.....	4	3	3	.....	.....	4	72	29	6	.....
South Carolina.....	76	5,508	2,285	2,799	424	2,069	91,509	22,135	7,357	8,401
Anderson.....	6	553	139	285	129	700	5,660	415	595	1,505
Columbia.....	11	1,055	529	474	52	141	13,123	3,261	1,967	225
Florence.....	8	204	96	100	8	162	8,337	5,561	505	240
Greenville.....	12	1,295	443	704	148	194	18,447	3,781	1,155	658
Newberry.....	8	205	94	109	2	121	2,875	727	300	253
Orangeburg.....	10	466	244	206	16	430	12,852	2,413	1,724	34
Spartanburg.....	12	1,535	629	841	65	64	27,517	4,453	705	5,486
Union.....	9	195	111	80	4	257	2,698	1,524	406	.....
South Dakota.....	25	66	33	31	2	37	551	216	115	108
Aberdeen.....	12	20	5	13	2	10	264	27	68	67
Lead.....	1	.....	.....	.....	.....	1	6	3	.....	3
Sioux Falls.....	12	46	28	18	.....	26	281	186	47	38

Reports of clinics, including those operating under the joint control of the Public Health Service and State boards of health, July 1, 1921-June 30, 1922—Continued.

State and city.	Total monthly reports received.	Patients admitted.				Patients discharged as non-infectious.	Treatments given.	Doses of arsphenamine given.	Wassermann tests made.	Microscopic examinations, gonococcus.
		Total.	Syphilis.	Gonorrhea.	Chancroid.					
Tennessee.....	89	5,414	3,302	1,725	387	2,201	74,189	17,174	16,976	9,599
Chattanooga.....	12	720	332	368	20	295	15,825	3,830	977	2,211
Johnson City.....	9	92	43	44	5	27	7	88	23	.....
Knoxville.....	12	1,067	702	344	21	236	14,837	3,730	1,718	1,750
Memphis (2).....	23	1,994	1,486	391	117	981	20,753	5,113	11,366	2,444
Nashville (3).....	33	1,541	739	578	224	662	22,767	4,413	2,892	3,185
Texas.....	85	7,839	4,086	2,967	786	5,112	93,405	18,311	9,522	9,414
Austin.....	2	3	3	.....	.....	.....	5	12	8	.....
Corpus Christi.....	4	66	9	57	.....	73	354	30	50	130
Dallas.....	12	1,915	972	871	72	1,011	26,304	3,720	1,624	1,438
El Paso.....	12	778	396	308	74	417	24,123	1,799	1,208	1,691
Fort Worth.....	8	289	159	117	13	30	3,952	744	253	193
Galveston.....	12	776	410	233	133	498	6,052	3,818	624	495
Houston.....	12	3,146	1,655	1,004	487	2,697	33,196	6,252	4,234	3,502
San Antonio.....	12	735	402	327	6	294	434	1,356	1,141	1,762
Waco.....	11	131	80	50	1	92	985	580	380	203
Utah.....	25	374	134	213	27	162	7,628	741	749	1,040
Ogden.....	12	49	12	31	6	29	4,810	39	47	391
Salt Lake City (2).....	13	325	122	182	21	133	2,818	702	702	649
Vermont.....	42	151	116	34	1	169	2,574	1,252	329	121
Barre.....	12	15	14	1	.....	3	134	119	22	1
Burlington (2).....	18	108	77	31	.....	98	1,849	801	191	106
Rutland.....	12	28	25	2	1	68	591	332	116	14
Virginia.....	124	4,388	2,612	1,594	182	2,431	52,427	17,657	11,726	5,024
Alexandria.....	12	181	82	90	9	154	4,670	1,198	417	395
Charlottesville.....	9	280	189	80	11	70	4,657	1,224	2,888	394
Danville.....	12	264	171	88	5	51	1,735	965	539	114
Lynchburg.....	11	238	77	137	24	238	620	626	318	588
Newport News.....	12	567	420	144	3	399	11,463	2,668	1,263	1,082
Norfolk (2).....	15	910	532	269	109	497	8,788	2,887	1,135	719
Norton.....	12	380	215	165	.....	297	2,923	1,356	402	36
Petersburg.....	12	335	209	126	.....	122	3,267	1,594	618	452
Richmond.....	12	774	470	299	5	402	10,750	3,747	3,171	1,127
Roanoke.....	12	354	182	162	10	154	2,561	953	125	35
South Boston.....	1	7	3	4	.....	1	.....	3	1	.....
University.....	4	98	62	30	6	46	993	436	819	82
Washington.....	34	1,095	531	557	7	535	20,882	4,753	5,733	5,182
Seattle.....	12	491	267	218	6	117	8,481	3,086	4,025	1,259
Spokane.....	10	448	182	266	.....	344	11,902	1,497	1,384	3,402
Tacoma.....	12	156	82	73	1	74	499	170	324	521
West Virginia.....	22	449	339	106	4	272	1,920	2,470	552	192
Charleston.....	11	191	140	48	3	224	792	890	180	35
Huntington.....	1	5	5	.....	.....	4	.....	38	51	22
Wheeling.....	10	253	194	58	1	44	1,128	1,542	321	135
Wisconsin.....	151	1,061	425	631	5	270	5,712	4,001	4,998	3,35
Beloit.....	12	62	23	38	1	46	282	248	12	10
Green Bay.....	11	21	14	7	.....	6	95	88	28	19
Janesville.....	12	28	10	18	.....	25	384	117	59	72
Kenosha.....	11	48	29	19	.....	5	90	40	90	84
La Crosse.....	11	70	37	32	1	11	565	215	246	350
Madison.....	12	63	19	44	.....	15	112	173	114	156
Milwaukee (3).....	35	519	194	324	1	69	2,619	2,670	3,979	1,924
Oshkosh.....	12	45	10	35	.....	15	338	97	53	142
Racine.....	11	53	37	15	1	17	110	57	115	80
Superior.....	12	70	35	34	1	20	781	258	261	348
Wausau.....	12	82	17	65	.....	41	336	38	41	166
Wyoming.....	12	99	47	50	2	37	1,394	235	390	309
Casper.....	12	99	47	50	2	37	1,394	235	390	309

On the basis of the number of monthly reports received and the total admissions to clinics, the monthly and daily average of patients admitted has been obtained for each State and the results tabulated below. Comparison with a similar table in the annual report for 1921 shows the average monthly admissions per clinic for the United States in 1921 to be 3.4 in excess of those reported in 1922. Texas heads the list in 1922 with a monthly average per clinic of 92.2. South Carolina ranks second with an average of 72.5. The complete report follows:

Table showing States ranked according to the monthly and daily average admissions per clinic, July 1, 1921-June 30, 1922.

Rank.	State.	Monthly average new admissions per clinic.	Daily average new admissions per clinic.	Rank.	State.	Monthly average new admissions per clinic.	Daily average new admissions per clinic.
	United States..	26.2	0.9	23	West Virginia.....	20.4	0.7
1	Texas.....	92.2	3.1	24	Oklahoma.....	20.3	.7
2	South Carolina.....	72.5	2.4	25	Kansas.....	18.9	.6
3	Alabama.....	66.3	2.2	26	Kentucky.....	18.3	.6
4	Louisiana.....	62.8	2.1	27	Minnesota.....	18.2	.6
5	Tennessee.....	60.8	2.0	28	Colorado.....	17.5	.6
6	Georgia.....	50.3	1.7	29	New Jersey.....	17.4	.6
7	Oregon.....	46.2	1.5	30	Nebraska.....	15.0	.5
8	Missouri.....	45.2	1.5	31	Utah.....	15.0	.5
9	Mississippi.....	43.3	1.4	32	Connecticut.....	14.5	.5
10	Maryland.....	36.4	1.2	33	Pennsylvania.....	12.8	.4
11	Florida.....	36.0	1.2	34	Delaware.....	12.0	.4
12	Virginia.....	35.4	1.2	35	Iowa.....	11.8	.4
13	California.....	35.3	1.2	36	Rhode Island.....	11.1	.4
14	Arkansas.....	33.5	1.1	37	New York.....	10.9	.4
15	Washington.....	32.2	1.1	38	Wyoming.....	8.3	.3
16	Illinois.....	30.8	1.0	39	New Mexico.....	7.1	.2
17	Ohio.....	30.1	1.0	40	Wisconsin.....	7.0	.2
18	Michigan.....	29.0	1.0	41	New Hampshire.....	6.3	.2
19	District of Columbia..	24.5	.8	42	Maine.....	5.9	.2
20	Indiana.....	22.6	.8	43	Vermont.....	3.6	.1
21	North Carolina.....	22.0	.7	44	North Dakota.....	2.9	.1
22	Massachusetts.....	20.5	.7	45	Montana.....	2.7	.1
				46	South Dakota.....	2.6	.1

Reports of other institutions.—In addition to the 541 clinics whose reports have been under discussion, the division has received monthly reports from 29 correctional and penal institutions, where venereal diseases are treated, which may be tabulated as follows:

Patients admitted:	
Syphilis.....	1, 942
Gonorrhea.....	1, 381
Chancroid.....	59
Total.....	3, 382
Patients discharged as noninfectious.....	2, 616
Treatments given.....	90, 669
Doses of arsphenamine administered.....	11, 928
Wassermann tests made.....	12, 045
Microscopic examinations for gonococcus infection.....	4, 278

REPORTING OF VENEREAL DISEASES.

Reports of cases of venereal diseases received from the State boards of health totaled 333,718 in 1922, a decrease of 53,525, or 13 per cent, from the number reported in 1921. Of the total, 171,824 were

syphilis, 152,959 gonorrhea, and 8,935 chancroid. In comparing with reports³ for 1921, syphilis shows a decrease of 12,266, or 6.7 per cent; gonorrhea of 36,968, or 19.5 per cent; and chancroid a decrease of 4,291, or 32.4 per cent. Syphilis is reported in excess of gonorrhea, although the latter is known to be more prevalent.

The following graph shows the yearly variation in the cases of venereal diseases reported:

Cases of venereal diseases reported to State boards of health.

Chancroid

1919	7,843
1920	10,861
1921	13,226
1922	8,935

Syphilis

1919	100,466
1920	142,869
1921	184,090
1922	171,824

Gonorrhea

1919	131,193
1920	172,387
1921	189,927
1922	152,959

The division is unable to account definitely for this decrease in the number of cases reported. The question of a possible decrease in incidence in infection has been discussed on page 274 of this report, but a slight decrease in the amount of infection would not account for a decrease of 13 per cent in the cases reported. At a recent conference of venereal-disease-control officers, the need for developing better cooperation among physicians in the matter of reporting cases was stressed, and letters from State boards of health have also

³ Correction in the totals for 1921 Pennsylvania should be made as follows:

Total.	Syphilis.	Gonorrhea.	Chancroid.
1,172	4,473	2,686	13
This correction makes the 1921 totals for the United States read:			
Total.	Syphilis.	Gonorrhea.	Chancroid.
387,243	184,090	189,927	13,226

spoken of this need. It is probable that an organized effort on the part of State boards of health to explain to the physicians the value of reporting as a public-health measure would bring in larger returns. Educational activities for the purpose of bringing infected persons to reliable practitioners for treatment should also be inaugurated.

Below is a tabulated record of the reports received from the States:

Cases of venereal diseases reported to State boards of health, July 1, 1921-June 30, 1922.

State.	Total.	Syphilis.	Gonorrhea.	Chaneroid.
United States.....	333,718	171,824	152,959	8,935
Alabama.....	11,753	7,181	4,244	328
Arizona.....	192	90	97	5
Arkansas.....	10,079	5,377	4,560	142
California.....	8,049	4,171	3,878	.....
Colorado.....	3,359	1,173	2,065	121
Connecticut.....	2,335	1,591	744	(¹)
Delaware.....	1,038	484	478	76
District of Columbia ²	294	230	63	1
Florida.....	4,109	2,068	1,796	245
Georgia.....	9,759	4,908	4,483	368
Idaho.....	391	138	244	9
Illinois.....	15,871	6,129	9,458	284
Indiana.....	5,178	2,682	2,422	74
Iowa.....	3,007	906	2,043	58
Kansas.....	2,845	1,278	1,526	41
Kentucky.....	29,379	19,735	9,277	367
Louisiana.....	7,844	3,788	3,464	592
Maine.....	1,549	618	920	11
Maryland.....	4,096	1,920	2,065	111
Massachusetts.....	9,311	3,049	6,258	4
Michigan.....	16,249	7,105	9,088	106
Minnesota.....	7,732	3,196	4,442	94
Mississippi.....	3,111	1,754	1,138	219
Missouri.....	11,893	4,977	6,073	843
Montana.....	803	371	432	.....
Nebraska.....	5,170	1,547	3,376	247
Nevada ³.....	.....	.....	.....	.....
New Hampshire.....	734	299	431	4
New Jersey.....	5,530	3,015	2,428	87
New Mexico.....	375	119	250	6
New York.....	33,358	23,718	9,598	42
North Carolina.....	7,494	3,534	3,702	258
North Dakota.....	840	231	593	16
Ohio.....	11,093	5,691	4,865	537
Oklahoma.....	2,133	1,032	982	119
Oregon.....	2,274	750	1,478	79
Pennsylvania.....	6,617	2,810	3,728	64
Rhode Island.....	11,193	7,651	3,526	16
South Carolina.....	7,075	3,004	3,638	433
South Dakota.....	838	292	526	20
Tennessee.....	7,562	3,909	3,204	449
Texas.....	42,060	21,025	19,100	1,935
Utah.....	719	189	510	20
Vermont.....	682	306	376	.....
Virginia.....	4,990	2,627	2,173	190
Washington ⁴	1,095	531	557	7
West Virginia.....	8,136	3,951	3,898	287
Wisconsin.....	2,903	510	2,373	20
Wyoming.....	621	164	439	18

¹ Included in syphilis.

² From clinical reports.

³ Not reporting.

A study of the reports of cases from the States shows an increase for 1922 in 11 States only, as compared with 19 States in 1921 and 34 States in 1920. Five States only, Oregon, Rhode Island, Kentucky, Missouri, and Arkansas, show increase for both 1921 and 1922.

The following table gives the States ranked according to the percentage of increase or decrease in the number of cases reported in 1922 as compared with 1921:

Table showing States ranked according to the percentage of increase or decrease in the number of cases of venereal diseases reported in 1922 over 1921.

STATES SHOWING INCREASE.

Rank.	State.	Per cent.	Rank.	State.	Per cent.
1	Oregon.....	56.61	7	Missouri.....	16.02
2	Delaware.....	51.75	8	Arkansas.....	13.41
3	Rhode Island.....	49.39	9	Georgia.....	8.46
4	Idaho.....	34.83	10	South Dakota.....	6.35
5	Tennessee.....	23.10	11	North Carolina.....	2.07
6	Kentucky.....	19.18			

STATES SHOWING DECREASE.

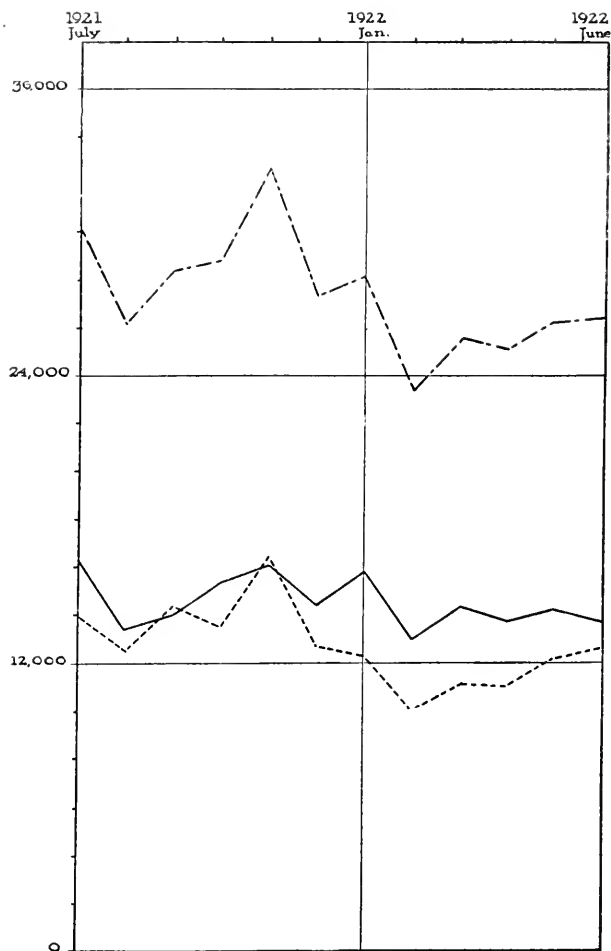
12	Ohio.....	0.31	30	Nebraska.....	23.28
13	Colorado.....	1.67	31	Louisiana.....	24.07
14	Massachusetts.....	2.73	32	Alabama.....	24.27
15	New York.....	3.66	33	Virginia.....	25.04
16	Indiana.....	5.11	34	Iowa.....	25.31
17	Pennsylvania.....	7.74	35	North Dakota.....	25.73
18	Maine.....	10.25	36	Florida.....	27.77
19	California.....	10.50	37	Utah.....	29.92
20	Vermont.....	10.73	38	New Mexico.....	35.01
21	Maryland.....	12.37	39	Connecticut.....	35.57
22	Kansas.....	15.63	40	Arizona.....	40.74
23	Michigan.....	15.75	41	South Carolina.....	41.81
24	Wisconsin.....	16.29	42	Illinois.....	44.57
25	Texas.....	17.02	43	Montana.....	45.19
26	New Jersey.....	19.25	44	Wyoming.....	60.27
27	Minnesota.....	19.50	45	Mississippi.....	60.77
28	West Virginia.....	20.72	46	Oklahoma.....	67.97
29	New Hampshire.....	21.33			

The highest point for the year in cases of gonorrhea and syphilis reported was reached in November, 1921, with a total of 33,083; the lowest point was reached in February, 1922, with a total of 23,164. The graph on page 292 shows the monthly variation in the cases of gonorrhea and syphilis reported and of the combined total of these diseases for the last year.

DISTRIBUTION OF ARSPHENAMINE.

The State boards of health reported the distribution of 517,250 doses of arsphenamine or similar product for the year 1922, a decrease of 15,528, or approximately 3 per cent, from 1921. More than 98 per cent of the total was reported as administered by the clinics, showing practically no distribution to hospitals or to physicians in private practice.

The graph at bottom of page 292 and table on page 293 show the amounts distributed during the past four years and the totals reported by the several States in 1922.



Doses of arsphenamine administered through State boards of health

1919		118,055
1920		328,382
1921		532,778
1922		517,250

State report of doses of arsphenamine (or similar product) distributed July 1, 1921-June 30, 1922.

State.	Doses distributed.	State.	Doses distributed.
United States.....	517,250	Montana.....	637
Alabama.....	32,523	Nebraska.....	5,851
Arizona.....	301	Nevada ².....	.....
Arkansas.....	10,503	New Hampshire.....	2,057
California.....	12,166	New Jersey.....	12,924
Colorado.....	5,219	New Mexico.....	295
Connecticut.....	6,424	New York.....	28,977
Delaware.....	617	North Carolina.....	8,490
District of Columbia ¹	1,164	North Dakota.....	583
Florida.....	9,755	Ohio.....	33,050
Georgia.....	18,989	Oklahoma.....	7,009
Idaho.....	781	Oregon.....	1,325
Illinois.....	26,505	Pennsylvania.....	25,339
Indiana.....	23,580	Rhode Island.....	6,639
Iowa.....	8,000	South Carolina.....	21,945
Kansas.....	8,281	South Dakota.....	216
Kentucky.....	18,064	Tennessee.....	17,145
Louisiana.....	17,627	Texas.....	18,891
Maine.....	1,417	Utah.....	741
Maryland.....	7,919	Vermont.....	1,269
Massachusetts.....	37,984	Virginia.....	16,483
Michigan.....	19,763	Washington ¹	4,753
Minnesota.....	1,282	West Virginia.....	3,370
Mississippi.....	8,315	Wisconsin.....	4,165
Missouri.....	17,682	Wyoming.....	235

¹ From clinical reports.

² Not reporting.

Each year the division has furnished arsphenamine and neoarsphenamine to certain communities through the State boards of health to make possible the establishment of clinics for the purpose of demonstrating the value of free medical service and of inducing these communities to continue the work. The funds for this work have been taken from the general appropriations for division expenses. During 1922, \$1,060 was spent in this way.

REQUESTS FOR MEDICAL INFORMATION.

The division has handled 1,047 requests for medical information in 1922 as compared with 2,605 in 1921. About 72 per cent of those asking for information have complained of suffering from a venereal disease. A classification of the requests according to the nature of the complaint follows:

Venereal diseases.....	338
Syphilis.....	132
Gonorrhea.....	271
Gleet.....	13
Chancroid.....	2
Lost manhood.....	64
Masturbation.....	43
Seminal emissions.....	38
Spermatorrhea.....	1
Venereal disease literature and addresses of clinics.....	15
Hydrocele and varicocele.....	16
General.....	114
Total.....	1,047

The "Health column" issued by the section of public health education, which was given as the main source of information about the

service in 1921, was discontinued. Train and lavatory placards were the main source of information to which reference was made in requests received in 1922. A classification of these sources follows:

Train and lavatory placards.....	116
Health column.....	39
Advertisements.....	56
Venereal disease literature.....	20
Motion picture.....	2
Radio.....	2
State Board of Health of Maryland.....	4
Kansas City Provident Association.....	1
Pamphlet in library.....	1
Exhibit.....	3
Not stated.....	808
Total.....	1,047

EDUCATIONAL MEASURES.

The decrease in the volume of educational work which was in evidence in 1921 has been more marked in 1922. The States have drawn upon their reserve supply of pamphlets, as is shown by the fact that they distributed over 2,000,000 while they purchased less than 1,700,000. Fewer lectures and showings of exhibits and films have been reported in 1922 than in 1921. The division has not been in a position to initiate educational work through field activities or through general circularizations because of limited personnel and a greatly depleted stock of pamphlets. The restrictions placed by law upon the number of copies of any one pamphlet which may be issued has interfered with the educational work of the division since 1920. These restrictions are still operative. As suggested previously, the falling off of the educational work is possibly one of the reasons for the decrease in the number of cases of venereal diseases reported and in the average attendance at the clinics.

GENERAL FEATURES.

Pamphlets.—Requests for pamphlets received by the division and the State boards of health totaled 85,891, a decrease of 2,667 from those received in 1921. Only 32 per cent of the requests received by the division were referred to State boards of health for compliance as compared with nearly 50 per cent in 1921, due probably to the increasing number of requests for special material not available through the State boards of health.

The number of pamphlets distributed by the division and the State boards of health was 2,280,326, a decrease of 44.6 per cent from 1921.

The State boards of health report 1,698,711 pamphlets and placards purchased in 1922 as compared with 4,081,697 in 1921, a decrease of 58.4 per cent.

The following table gives the reports of purchases by the various States classified according to the kind of pamphlets bought. The letters A to F stand for the following groups:

A—Men.	D—Parents.
B—The general public	E—Girls.
C—Boys.	F—Educators.

Educational pamphlets and placards purchased by State boards of health July 1, 1921-June 30, 1922.

State.	Total.	A	B	C	D	E	F	Others.	Pla-cards.
United States.....	1,698,711	250,000	191,525	217,835	388,000	323,000	45,500	254,205	28,646
Alabama.....	10,000	5,000	.....	5,000	.....	.....	.....	.....	.....
Arizona.....	5,500	2,000	1,000	.....	1,000	1,000	500	.....	.....
Arkansas.....	50,000	.....	.....	.....	50,000	.....	.....	.....	.....
California.....	2,000	2,000	.....	.....	.....	.....	.....	.....	.....
Colorado.....	31,193	10,000	3,000	5,000	7,000	5,000	1,000	25	168
Connecticut.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Delaware.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
District of Columbia ¹.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Florida.....	4,000	4,000	.....	.....	.....	.....	.....	.....	.....
Georgia.....	75,550	5,000	.....	5,000	10,000	20,000	1,000	34,550	.....
Idaho.....	1,000	.....	.....	.....	.....	1,000	.....	.....	.....
Illinois.....	127,000	40,000	2,000	30,000	10,000	30,000	.....	.....	15,000
Indiana.....	165,200	.....	15,000	25,000	15,000	25,000	.....	25,200	.....
Iowa.....	20,000	10,000	.....	.....	.....	10,000	.....	.....	.....
Kansas.....	10,835	.....	1,000	5,835	1,000	2,000	.....	.....	1,000
Kentucky.....	6,000	.....	1,000	.....	5,000	.....	.....	.....	.....
Louisiana.....	16,100	.....	500	3,000	3,000	9,000	.....	600	.....
Maine.....	22,000	.....	10,000	.....	11,000	.....	.....	1,000	.....
Maryland.....	17,000	10,000	.....	.....	.....	7,000	.....	.....	.....
Massachusetts.....	25,075	15,000	1,075	.....	2,000	5,000	.....	2,000	.....
Michigan.....	15,100	5,000	.....	.....	.....	10,000	.....	.....	100
Minnesota.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mississippi.....	43,000	5,000	5,000	.....	.....	10,000	.....	23,000	.....
Missouri.....	89,250	.....	.....	55,000	20,000	10,000	2,000	.....	2,250
Montana.....	2,000	.....	.....	2,000	.....	.....	.....	.....	.....
Nebraska.....	88,000	10,000	.....	10,000	23,000	30,000	10,000	5,000	.....
Nevada ¹.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
New Hampshire.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
New Jersey.....	134,178	25,000	10,000	10,000	5,000	10,000	.....	74,130	48
New Mexico.....	11,000	2,000	750	.....	5,000	3,000	.....	200	50
New York.....	280,500	40,000	85,000	.....	45,000	80,000	.....	20,500	10,000
North Carolina.....	140,000	.....	.....	.....	100,000	.....	.....	40,000	.....
North Dakota.....	17,000	.....	.....	.....	5,000	.....	.....	12,000	.....
Ohio.....	60,000	10,000	.....	10,000	15,000	15,000	10,000	.....	.....
Oklahoma.....	5,000	.....	.....	.....	.....	.....	.....	5,000	.....
Oregon.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pennsylvania.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rhode Island.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
South Carolina.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
South Dakota.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tennessee.....	5,000	5,000	.....	.....	.....	.....	.....	.....	.....
Texas.....	190,000	30,000	40,000	40,000	40,000	20,000	20,000	.....	.....
Utah.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Vermont.....	1,000	.....	.....	.....	.....	.....	.....	1,000	.....
Virginia.....	76,200	15,000	15,200	10,000	15,000	20,000	1,000	.....	.....
Washington ¹.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
West Virginia.....	10,000	.....	.....	.....	.....	.....	.....	10,000	.....
Wisconsin.....	3,000	.....	1,000	2,000	.....	.....	.....	.....	.....
Wyoming.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

¹ Not reporting.

A comparison of the table above with a similar table published in 1921 shows no purchases reported for 14 States as compared with 6 in 1921. The totals for the various States for the most part are considerably smaller in 1922. With regard to the classes of pamphlets purchased, pamphlet F shows the least decrease. Purchases of pamphlet B, however, have decreased 80 per cent, those of placards and of pamphlet A, 66 per cent, and of the others about 50 per cent. The great decrease in the number of B pamphlets purchased may indicate a tendency to use more specialized material, which would be in line with the feeling of several of the venereal-disease-control officers that educational activities should be more carefully adapted to the needs of the groups they are designed to reach.

The following new venereal-disease bulletins have been issued by the service in 1922:

67. Syphilis and Gonorrhea, Diseases of Youth. (A report of 8,413 cases.)
68. An Open Forum on the Open House.
69. Status of Sex Education in High Schools.
70. Dividends from Venereal Disease Control.
71. You and Your Boy.

Numbers 67, 68, and 70 are pamphlets of general interest, while the "Status of Sex Education in High Schools" is of particular interest to educators, and "You and Your Boy" was written for parents.

Abridged editions of the illustrated leaflets describing the "Keeping Fit" and "Youth and Life" exhibits have also been issued.

Exhibits and lantern slides.—A small edition of the "Youth and Life" exhibit has been issued and work done on the copy for a set of lantern slides for girls. Much work has also been done on the preparation of an exhibit for colored girls.

The States have borrowed or purchased 770 exhibits and sets of lantern slides in 1922 as compared with 658 in 1921. The small exhibits are proving very popular because of the convenient size and the small cost. The number of showings of exhibits and lantern slides reported has decreased 27 per cent, being 3,251 in 1922 as compared with 4,442 in 1921. The average attendance at showings reported in 1922 was 264.

Motion-picture films.—The States report 45 films purchased or borrowed as compared with 136 in 1921. A total of 1,206 showings has been reported for the country with an average attendance of 217, a decrease in the number of showings of about 28 per cent.

Much time has been spent upon the preparation of a series of 12 reels of educational films graded for use in schools. The series is entitled the "Science of Life" and has been prepared in cooperation with the Bureau of Education. Following are the subjects of the various reels:

1. Protoplasm, the Beginning of Life.
2. Reproduction in Lower Forms of Life.
3. Interdependence of Living Things.
4. Reproduction in Higher Forms.
5. How Plants and Animals Cause Disease.
6. How Disease is Spread.
7. How to Prevent Disease.
8. How the Mosquito Spreads Disease.
9. The Fly as a Disease Carrier.
- 10f. Personal Hygiene for Young Women.
- 10m. Personal Hygiene for Young Men.
11. General Hygiene.
12. General Hygiene.

The reels are practically finished and will be ready for use in the fall. The following table gives the amount of exhibit material secured by the State boards of health in 1922:

Exhibits, lantern-slide sets, and motion-picture films borrowed or purchased by State boards of health, July 1, 1921-June 30, 1922.

State.	Exhibits.	Slides.	Films.	State.	Exhibits.	Slides.	Films.
United States.....	750	20	45	Montana.....			3
Alabama.....	8		4	Nebraska.....	175		
Arizona.....	3			Nevada.....			
Arkansas.....				New Hampshire.....			
California.....	4			New Jersey.....	37		2
Colorado.....	7			New Mexico.....	13	6	4
Connecticut.....	6	6		New York.....	205		4
Delaware.....				North Carolina.....			
District of Columbia ¹				North Dakota.....			
Florida.....	2			Ohio.....	2		
Georgia.....	19	1		Oklahoma.....			
Idaho.....			2	Oregon.....			
Illinois.....	9			Pennsylvania.....	10		
Indiana.....	4			Rhode Island.....	12		
Iowa.....	10			South Carolina.....	14		
Kansas.....	6			South Dakota.....	14		
Kentucky.....	7	1	2	Tennessee.....	14		12
Louisiana.....	2			Texas.....			
Maine.....	2		5	Utah.....			
Maryland.....	8			Vermont.....			
Massachusetts.....	46		1	Virginia.....	5		5
Michigan.....			1	Washington ¹			
Minnesota.....	10			West Virginia.....			
Mississippi.....	16			Wisconsin.....			
Missouri.....	80	6		Wyoming.....			

¹ Not reporting.

Cooperative relations with the American Social Hygiene Association have been continued through 1922, and the following report of sales of exhibits has been received from this organization:

	Total.	Keeping Fit (large).	Keeping Fit (small).	Youth and Life (large).	Youth and Life (small).	Venereal Menace.
Total orders filled.....	1,698	30	1,093	37	531	7
State boards of health.....	643	19	334	23	263	4
Others.....	1,055	11	759	14	268	3

In addition the association reports 258,500 service pamphlets sold to State boards of health, 7,900 to other purchasers, and 40,295 pieces of the industrial program sold.

Lectures and addresses.—A total of 6,931 lectures and addresses, with an average attendance of 135, has been reported to the service in 1922, a decrease of 22.8 per cent from 1921. It is of interest to note that the decrease in the three classes of meetings reported—lectures, exhibit, and motion-picture showings—has been about 25 per cent for the year. The graph on page 298 shows the relative increase and decrease in educational activities of this class for the last four years.

Film Showings

1919	1,398
1920	2,157
1921	1,684
1922	1,206

Exhibit and Slide Showings

1919	2,186
1920	11,033
1921	4,442
1922	3,251

Lectures

1919	8,209
1920	12,360
1921	8,991
1922	6,931

Following is the complete report of educational activities carried on by the State boards of health in 1922:

State report of educational activities, July 1, 1921-June 30, 1922.

States.	Pamphlets distributed.	Lectures.			Film showings.		Exhibit and slide showings.	
		Num-ber.	Aver-age attend-ance.	Exhibit ma-terial used.	Num-ber.	Aver-age attend-ance.	Num-ber.	Aver-age attend-ance.
United States.....	2,071,046	5,983	133	588	1,188	218	3,251	264
Alabama.....	75,043	356	148	.....	14	253	15	233
Arizona.....	2,767	.....	.....	.....	.....	.....	.....	.....
Arkansas.....	39,210	133	131	.....	48	82	488	123
California.....	44,151	300	77	.....	88	214	37	224
Colorado.....	21,231	47	276	21	23	663	54	50
Connecticut.....	16,004	1	150	.....	.....	.....	.....	.....
Delaware.....	21	.....	.....	.....	.....	.....	.....	.....
District of Columbia.....	.....	52	65	.....	1	30	23	751
Florida.....	10,810	121	211	21	29	308	204	28
Georgia.....	52,602	200	135	.....	17	289	59	668
Idaho.....	13,813	39	269	.....	21	268	.....	.....
Illinois.....	165,512	172	249	7	174	268	609	107
Indiana.....	98,771	56	97	12	30	139	167	129
Iowa.....	28,359	548	183	.....	48	375	8	47
Kansas.....	38,149	58	222	50	3	16	233	59
Kentucky.....	53,626	18	159	.....	14	441	.....	.....
Louisiana.....	36,130	84	153	42	10	128	4	375
Maine.....	19,235	254	113	8	1	.....	.....	.....
Maryland.....	11,120	24	318	24	90	167	124	252

State report of educational activities, July 1, 1921-June 30, 1922—Continued.

States.	Pamphlets distributed.	Lectures.			Film showings.		Exhibit and slide showings.	
		Num-ber.	Aver-age attend-ance.	Exhibit ma-terial used.	Num-ber.	Aver-age attend-ance.	Num-ber.	Aver-age attend-ance.
Massachusetts.....	17, 128	10	25	.....	3	308	15	88
Michigan.....	45, 945	472	91	55	42	222	142	2, 370
Minnesota.....	19, 594	85	96	38	33	175	85	58
Mississippi.....	35, 131	140	166	38	2	175	.....	.....
Missouri.....	102, 866	43	153	.....	21	272	154	115
Montana.....	12, 360	20	76	1	14	55	19	55
Nebraska ²	97, 390	36	151	.....	8	166	3	215
Nevada ¹.....	.....	.....	.....	.....	.....	.....	.....	.....
New Hampshire.....	5, 771	23	94	.....	.....	.....	.....	.....
New Jersey.....	120, 032	195	135	21	.....	.....	.....	.....
New Mexico.....	1, 847	.....	.....	.....	1	75	6	81
New York.....	299, 557	544	116	105	87	267	115	860
North Carolina.....	37, 562	21	361	.....	6	334	1	121
North Dakota.....	11, 486	18	104	.....	4	238	6	213
Ohio.....	130, 774	105	201	.....	8	53	.....	.....
Oklahoma.....	8, 734	3	200	.....	.....	.....	14	86
Oregon.....	15, 912	406	60	.....	122	100	1	15
Pennsylvania.....	12, 510	66	169	.....	32	214	36	249
Rhode Island.....	3, 032	18	245	.....	.....	.....	.....	.....
South Carolina.....	9, 401	.....	.....	.....	.....	.....	80	60
South Dakota.....	30, 859	51	169	31	3	250	.....	.....
Tennessee.....	54, 213	31	121	14	.....	.....	.....	.....
Texas.....	48, 675	.....	.....	.....	.....	.....	.....	.....
Utah.....	7, 861	.....	.....	.....	.....	.....	26	2, 923
Vermont.....	890	.....	.....	.....	.....	.....	.....	.....
Virginia.....	62, 865	343	136	17	21	.....	8	500
Washington ¹.....	.....	.....	.....	.....	.....	.....	.....	.....
West Virginia.....	7, 297	21	152	.....	58	91	22	31
Wisconsin.....	144, 023	867	86	83	200	218	493	41
Wyoming.....	777	2	59	.....	.....	.....	.....	.....

¹ Not reporting.² Nebraska submitted a special report of exhibits on permanent display from October to May. The number of exhibits so shown was increased monthly as follows:

October.....	27	January.....	48
November.....	40	February.....	50
December.....	44	March.....	52
April.....	53		

In April approximately 1,375 persons in five different towns saw the exhibits. In May they were viewed by over 8,000 persons in Y. M. C. A.'s. and schools. This report is not included in the table above.

SPECIAL FEATURES.

Educators.—Only two formal conferences for educators similar to those of previous years were held in 1922, one in Lexington, Ky., in February and one in Muncie, Ind., in March. The remaining 30 conferences were informal meetings of selected teachers held in the individual high schools. It was felt that it would be possible to reach more teachers in this way with less expenditure of effort in making arrangements and with less inconvenience to those attending. The informality of the small conference was also considered an asset as affording greater opportunity for questions and discussion. The total attendance at the 1922 conferences was 1,296, as compared with 3,851 in 1921. In addition to the conferences 13 lectures to educators in summer schools, normal schools, and teachers' conventions were given, reaching 3,315 educators.

The manual for educators which has been in preparation for some time is at press and will be out shortly after the 1st of July, 1922.

Conferences for nonprofessional women.—The most important achievement in the educational work of the division has been the

series of 10 social hygiene conferences for nonprofessional women. The purpose of these conferences was to educate women to understand the problems of social hygiene in order that they might be better fitted to work for the improvement of social conditions and to train others for such work.

These conferences were held under the auspices of the State boards of health and the Public Health Service, and were sponsored in each case by various women's organizations. Following is a list showing the place, date, and attendance of each conference:

Place.	Date.	Number present.
Washington, D. C.....	Oct. 4-6, 1921.....	250
St. Louis, Mo.....	Dec. 5-7, 1921.....	400
Columbia, S. C.....	Jan. 10-11, 1922.....	250
Birmingham, Ala.....	Jan. 16-18, 1922.....	200
Memphis, Tenn.....	Jan. 25-27, 1922.....	150
Louisville, Ky.....	Jan. 31-Feb. 3, 1922.....	270
Indianapolis, Ind.....	Feb. 13-18, 1922.....	275
Pittsburgh, Pa.....	Feb. 20-23, 1922.....	¹ 280
Kansas City, Kans.....	Apr. 11-12, 1922.....	¹ 150
Newark, N. J.....	Apr. 19-20, 1922.....	¹ 500

¹ Conference attended by women delegates from different parts of the State.

The programs were, in general, divided into three sections, which presented the medical, the legal, and the educational aspects of the problem. Speakers were secured through the aid of the Public Health Service, the State boards of health, and local workers. The regular program was followed by round tables, at each of which one of the above aspects was brought up for discussion and opportunity given for debate on local problems.

The attendance at these conferences ranged between 150 and 500 women each. The fact that a large portion of the audience consisted of delegates, each one being delegated to take back to her organization what she had learned at the conference, makes it evident that the results were much more far-reaching than would appear from the mere list of attendance.

As a result of several of the conferences, groups of women organized to study social hygiene. A course of study was prepared by the division for use by these groups covering the following subjects:

1. Psychological bases of sex problems.
2. Methods of handling the sex problems of childhood.
3. Methods of handling the sex problems of adolescence.
4. Antisocial sex manifestations.
5. Effects of prostitution upon the individual and society.
6. Venereal diseases, an effect of prostitution.
7. Rehabilitation of the delinquent.
8. Enforcement of laws for the—
 - a. Suppression of prostitution.
 - b. Control of venereal diseases.

Work with the colored population.—Intensive work was done in four States by the colored personnel of the division: Louisiana, Kentucky, Texas, and Alabama. Contacts were also made in some 15 other States. Reports of 522 lectures, with a total attendance of 113,927, have been received.

LAW-ENFORCEMENT MEASURES.

This has been a nonlegislative year in most of the States, and two States only have reported the passage of laws for the purpose of controlling venereal diseases.

Reports of six city ordinances passed have been received.

In general it may be said that most of the States have adequate laws to provide for the control of venereal diseases and the suppression of prostitution. The need now is not so much for more laws as it is for the enforcement of existing legislation. A demand for the enforcement of these laws depends largely upon an enlightened public opinion, and this must be created through education.

INDICES OF PROGRESS.

Progress in the control of venereal diseases will be measured ultimately by a decrease in the number of infections and in the control of infections as they occur. In order to determine what progress is being made, data must be assembled which will show any decrease or increase in the number of new infections, also the ratio between acute and chronic cases. After a series of conferences the following indices have been selected as being those which will show in the most concrete way the progress made. These indices were also selected on the basis of data available through State boards of health or through institutions whose cooperation might be secured:

- I. Reduction in the number of deaths from syphilis.
- II. A. Reduction in the number of cases of venereal diseases reported.
 1. Acute cases of gonorrhea.
 2. Chronic cases of gonorrhea.
 3. Primary lesions of syphilis.
 4. Latent, secondary, and tertiary stages of syphilis.
 5. Sequelæ of gonorrhea and syphilis.
- B. Increase in the number of physicians reporting.
- III. A. Decrease in total number of cases of syphilis and gonorrhea in penal and eleemosynary institutions.
- B. Increase in number of routine examinations in penal and eleemosynary institutions.
- IV. A. Decrease in number of positive Wassermanns in laboratories.
- B. Increase in number of laboratory examinations made on specimens.
- V. A. Increase in hospitals admitting venereal cases.
- B. Decrease in number of pelvic operations upon women due to gonococcus infection.

During the past year considerable work has been done with the cooperation of State boards of health toward securing the information needed.

STATISTICAL SUMMARY.

The following table summarizes the activities in the control of venereal diseases for the years 1921 and 1922:

Statistical summary of activities in the control of venereal diseases for the fiscal years 1921 and 1922.

	1921	1922
<i>Medical activities.</i>		
A. Cases of venereal diseases reported to State boards of health:		
I. Gonorrhea.....	189,927	152,959
II. Syphilis.....	184,090	171,824
III. Chancroid and others.....	13,226	8,935
Total.....	387,243	333,718
B. Doses of arsphenamine (or similar product) distributed by State boards of health.....	532,778	517,250
C. Clinics:		
I. Clinics operating under joint control of State boards of health and Public Health Service.....	483	1,542
II. Clinics included under I established during the year.....	90	95
III. Clinics reporting activities.....	442	541
IV. Reports received from clinics—		
(a) Patients admitted.....	140,748	141,279
(b) Patients discharged as noninfectious.....	55,407	60,169
(c) Treatments given.....	251,885	2,045,232
(d) Wassermann tests made.....	185,325	298,486
(e) Microscopic examinations for gonococcus infection.....	2,605	192,745
D. Requests for medical information received by the Public Health Service.....	2,605	1,047
<i>Educational activities.</i>		
A. Pamphlets:		
I. Requests for pamphlets received by—		
(a) Public Health Service from—		
(1) Individuals.....	29,083	25,157
(2) Public officials and organizations.....	7,569	7,078
(3) Industries, commercial, and labor organizations.....	2,604	2,858
Total.....	39,256	35,093
(b) State boards of health from—		
(1) Public Health Service for compliance.....	18,346	11,175
(2) The public.....	49,302	50,798
Total.....	67,648	61,973
(c) Gross total requests for pamphlets received.....	106,904	97,066
Minus requests received by State boards of health from the Public Health Service.....	18,346	11,175
(d) Net total requests for pamphlets received.....	88,558	85,891
II. Pamphlets distributed—		
(a) By the Public Health Service—		
(1) In response to requests from—		
(1) Individuals.....	49,238	24,712
(2) Public officials and organizations.....	122,227	123,344
(3) Industries.....	7,967	1,362
(2) Directly to—		
(1) The public (official mailing lists and general circularizations).....	120,641	59,862
(2) State boards of health.....	34,241	132,154
(3) Public Health Service field officers.....	7,769	18,500
Total.....	342,083	359,934
(b) In the field by State boards of health.....	3,818,670	2,071,046
(c) Gross total pamphlets distributed.....	4,160,753	2,430,980
Minus pamphlets distributed by the Public Health Service to—		
(1) State boards of health.....	34,241	132,154
(2) Public Health Service field officers.....	7,769	18,500
Total subtracted.....	42,010	150,654
(d) Net total pamphlets distributed.....	4,118,743	2,280,326
III. Pamphlets and placards purchased by State boards of health.....	4,081,697	1,698,711
IV. Pieces of the industrial program purchased.....	84,763	40,295
V. Educational venereal disease pamphlets issued by the Public Health Service.....	7	5
VI. Revisions of educational venereal disease pamphlets issued by the Public Health Service.....	4	

¹ Including a few clinics no longer under joint Federal and State control.

Statistical summary of activities in the control of venereal diseases for the fiscal years 1921 and 1922—Continued.

	1921	1922
<i>Medical activities—Continued.</i>		
B. Lectures and addresses:		
I. Lectures and addresses reported by—		
(a) Public Health Service.....	607	948
(b) State boards of health.....	8,384	5,983
Total.....	8,991	6,931
II. Average attendance reported by—		
(a) Public Health Service.....	217	152
(b) State boards of health.....	130	133
Average attendance at total lectures reported.....	136	135
III. Lectures at which exhibit material was used—		
(a) Public Health Service.....	13	76
(b) State boards of health.....	2,258	588
Total.....	2,271	664
C. Conferences reported by the Public Health Service.....	16	42
Average attendance.....	243	96
D. Exhibits and lantern slides:		
I. Exhibits and slide sets loaned by the Public Health Service to—		
(a) State boards of health.....		188
(b) Public Health Service officers.....		109
(c) Others.....		214
Total.....		511
II. Exhibits and slide sets purchased or borrowed by—		
(a) State boards of health.....	658	770
(b) Y. M. C. A.'s.....	243	
(c) Others.....	155	1,075
Total.....	1,056	1,845
III. Exhibit and lantern slide showings reported by—		
(a) Public Health Service.....	25	
(b) State boards of health.....	4,417	3,251
Total.....	4,442	3,251
IV. Average attendance reported by—		
(a) Public Health Service.....	353	
(b) State boards of health.....	259	264
Average attendance at total showings.....	230	264
E. Motion-picture films:		
I. Motion-picture films loaned by the Public Health Service to—		
(a) State boards of health.....		6
(b) Others.....		22
Total.....		28
II. Motion-picture films purchased or borrowed by State boards of health.....	136	45
III. Motion-picture showings reported by—		
(a) Public Health Service.....	72	18
(b) State boards of health.....	1,612	1,188
Total.....	1,684	1,206
IV. Average attendance reported by—		
(a) Public Health Service.....	374	174
(b) State boards of health.....	256	218
Average attendance at total showings.....	261	217
F. Publicity material:		
I. Articles furnished magazines.....	4,192	9
II. Periodicals containing articles received.....	176	12
III. Circulation of articles published.....	1,780,795	126,600
<i>Legislative activities.</i>		
A. States receiving Federal funds.....	46	48
B. States enacting legislation for venereal disease control.....	39	22
C. City ordinances for venereal disease control.....	28	6

* Not including States making appropriations for venereal disease control purposes.

SPECIAL ACTIVITIES OF THE DIVISION OF VENEREAL DISEASES.

The division of venereal diseases cooperated in several enterprises contributory to the control of venereal diseases, which because of their importance merit special mention. They were the public-health institutes and the conference on the education of sanitarians.

PUBLIC HEALTH INSTITUTES.

During the winter and spring of 1922, 16 public-health institutes were held in various cities of the country under the auspices of State boards of health and the Public Health Service. These schools of instruction, lasting in most cases one week, were modeled to a considerable extent upon the Institute on Venereal Disease Control and Social Hygiene held in Washington, November, 1920. They covered, however, a much broader field. The success of the institutes lay in the inspiration and the stimulation for further individual study which health officers, private practitioners, educators, heads of institutions, and others received through coming into closer touch with some of the newer aspects of public health. The institutes were also of value to the communities in which they were held because they centered general attention on the problem of public health and helped to create in these communities, especially among women, active groups interested in a broad and constructive program.

The following table gives the places in which institutes were held, the dates, and registration at each. In most cases the State board of health was in charge, but generous cooperation was rendered by a number of voluntary organizations. The University of Pittsburgh, the school of public health of the University of Louisville, the University of Minnesota medical school, and a number of local medical organizations merit special attention.

Place.	Date.	Registration.	Place.	Date.	Registration.
New Orleans, La....	Jan. 9-13.....	105	Minneapolis, Minn..	Mar. 20-25.....	142
Columbia, S. C.....	Jan. 9-14.....	418	Portland, Oreg.....	Apr. 10-15.....	180
Dallas, Tex.....	Jan. 16-21.....	285	Kansas City, Kans...	Apr. 10-15.....	478
Birmingham, Ala...	Jan. 16-20.....	252	Spokane, Wash.....	Apr. 17-22.....	140
Memphis, Tenn.....	Jan. 23-28.....	299	Newark, N. J.....	Apr. 10-15.....	589
Louisville, Ky.....	Jan. 30-Feb. 4....	365	Albany, N. Y.....	Apr. 18-21.....	137
Indianapolis, Ind...	Feb. 13-18.....	822	Hartford, Conn.....	May 1-6.....	777
Pittsburgh, Pa.....	Feb. 20-25.....	264			
Chicago, Ill.....	Mar. 13-18.....	1,001	Total.....		6,254

The total registration at the 16 institutes was 6,254, an average of nearly 400 for each institute. This figure does not include, however, all those attending, inasmuch as a considerable number failed to register. Attendance varied at the different institutes, ranging all the way from 100 to 1,000. The institute at Chicago was the largest. At Indianapolis the excellent organization of the State health activities enabled large numbers of local health officers and nurses to attend. At Hartford the New England institute, drawing from a considerable population, and being well advertised, had a large attendance. In Kentucky and Kansas the institute was combined with the annual school for health officers, and in this way a large attendance of those most interested was secured.

An attempt has been made in the following list to classify persons attending. The necessary information was not available in three of the institutes, so that the number "unclassified" is large. Particularly large attendance on the part of nurses is to be noted. Many of the physicians registered were undoubtedly local health officers.

REGISTRATION BY OCCUPATION.

Physicians.....	1, 718	Judges and court officials.....	46
Nurses and social workers.....	1, 907	Unclassified.....	2, 169
Students.....	238		
Teachers and clergymen.....	107	Total.....	6, 254
Sanitary engineers.....	69		

There was no exact uniformity in the courses given at the various institutes. In most cases many of the newer aspects of public health were covered. At Portland, Oreg., for example, the schedule included the following courses: Tuberculosis, child hygiene, nutrition in health and disease, management of clinics, health centers, general communicable diseases, noncommunicable diseases, industrial hygiene, sanitary engineering, administrative problems, mental hygiene, medical social work, syphilis, gonorrhea, protective social work, and the delinquent. Of these the courses in syphilis, gonorrhea, tuberculosis, child hygiene, and mental hygiene were most popular.

The Chicago institute was devoted entirely to social hygiene and the venereal diseases, and was especially successful. These subjects attracted large attendance throughout the institutes. That there is in all parts of the country particular interest in various phases of social hygiene had already been demonstrated by the success of the institute in Washington, D. C., November, 1920. The experience in the local institutes further confirmed this fact.

High-grade faculties were provided for all the institutes. The best local talent available was supplemented, through the assistance of the service, by a group including some of the most prominent workers in their respective fields in the country.

Special evening meetings on the general subject of public health were held in connection with most of the institutes. These were attended by 5,731 persons. They were popular in character and were of especial value in stimulating general community interest in public health.

Clinics were provided in connection with a number of courses at most of the institutes. At the New York institute, which was held in Albany simultaneously with the meeting of the State medical society, no formal lectures were given; only a series of clinics on the venereal diseases. This institute was a marked success. Practical clinics are of great educational value to the partially trained medical man, particularly so in connection with courses in syphilis and gonorrhea, in the treatment of which no standardized practice has yet been established, and to which little attention has been paid in medical schools.

Much of the success of the meetings depended on publicity. Those with the largest attendance were extensively advertised. The New England institute, for example, was announced on every envelope mailed from the office of the Connecticut State Board of Health for some months previous to the sessions. Systematic efforts to get the

essential information to physicians and others interested are necessary in order to insure an attendance in keeping with the efforts expended.

One of the most successful features in connection with the institutes was the series of women's social hygiene conferences, which was discussed on page 299 of this report. With the increased participation of women in public affairs, a considerable proportion of their potential energies will naturally be devoted to activity in the field of public health. In common, however, with the general public they need a better understanding of the various problems if they are to participate intelligently in their solution. The conferences contributed largely to this end.

The utilization of the new knowledge in the field of public health can best be accelerated by carrying it to the workers. The institutes reached a considerable number of this group. Pending the development of more effective measures, they would seem to meet, to some extent, the need for more education on the part of the partially trained sanitarian. They would seem also to provide a method of stimulating general public interest and of giving community leaders a comprehensive view of the health problems which they are called upon to solve.

CONFERENCE ON THE FUTURE OF PUBLIC HEALTH IN THE UNITED STATES AND THE EDUCATION OF SANITARIANS.

On March 14 and 15, 1922, a group of educators and leaders in public-health work from all sections of the country met in Washington under the auspices of the Public Health Service to consider one of the most pressing problems in the field of public health today, the problem of personnel. The practical application of the scientific knowledge which has become available, and the effective utilization of the interest in public-health matters which is developing throughout the country, require a larger number of better-trained men and women in the field. The purpose of the conference was to bring to the attention of those engaged in the public-health movement the seriousness of the personnel problem and possibly to lead to the adoption of measures to improve conditions.

The delegates to the conference included presidents of 8 universities, deans and directors of 27 schools of public health, hygiene, and medicine, 37 professors of public-health subjects and other educators, 19 State and city health officers, 15 representatives of semipublic and private health organizations, 13 representatives of various Federal agencies, and 17 representatives of the Public Health Service; 136 in all.

The following subjects were discussed:

1. The present status of the education of sanitarians.¹
2. Newer aspects of public health and their importance in training sanitarians.
3. What kind of sanitarians are needed for the future.
4. How may more and better sanitarians be recruited.
5. How shall the sanitarians of the future be trained.

¹ In organizing the conference, it early became evident that a term more adequate and accurately descriptive than "health officer" would be necessary. The term "health officer" is usually understood to include only those employed by a city, county, or State to protect the health of a population group and to enforce certain health laws. The conference was concerned not only with such persons, but also with those employed in many other capacities in the work of public health in the United States. The most suitable inclusive term available seemed to be "sanitarian." It is used here to include all persons who are employed professionally in public-health work.

At the close of the conference resolutions were passed to the effect that the Congress of the American Medical Association on medical education, medical licensure, public health and hospitals, be urged to include a section on the education of health officers and sanitarians; and that the Surgeon General of the United States Public Health Service be requested and empowered to appoint a committee to consider whatever questions it sees fit and to take whatever further action for future conferences may seem wise in order to continue the activities that this conference had started.

A meeting of the committee appointed was held May 1, 1922, and the following recommendations were made to the Surgeon General:

1. That the Public Health Service send to university presidents and deans of medical schools a résumé of the recent conference.

2. That the Public Health Service send a representative of the service to various universities at intervals to address audiences of students regarding the field of public health as a life career.

3. That the Public Health Service publish a pamphlet suitable for distribution among medical students in particular and college students in general regarding the field of public health as a life career.

4. That the Public Health Service arrange for the preparation of a summary of existing conditions and regulations governing the appointment of State and municipal health officers, with data showing how frequently good health officers have been removed for political purposes. Also that the Public Health Service send to State and city health officers an inquiry to ascertain what steps, in their opinion, offer the most promise at the present time of developing a more secure tenure of office for health officers.

5. That medical schools be encouraged through correspondence to organize in a special group those studies now in the curriculum which contribute to the training of health officers, and to give publicity to the availability of such a group of courses in the hope that a larger number of centers of training may thus become available.

6. That the Public Health Service, so far as may be practicable, act as a clearing house for State boards of health and other health agencies who may be able to make short-term positions available at relatively low salaries, so that schools of public health may know where graduates may be placed for field training.

GENERAL INSPECTION SERVICE.

On July 1, 1921, there were the following institutions subject to inspection by the general inspection service:

United States marine hospitals.....	20
United States Public Health Service hospitals.....	52
United States Public Health Service relief stations, second and third class...	105
Hospitals under contract with United States Public Health Service (of which 776 were caring for Government beneficiaries).....	1,412

Investigations and inspections were made as follows:

Special investigations.....	422
Inspections:	
United States marine hospitals.....	54
United States Public Health Service (veterans') hospitals.....	116
United States Public Health Service relief stations.....	184
Contract hospitals.....	285
Property condemnations.....	71
Charges and specifications prepared.....	27

At the beginning of the fiscal year the general inspection service had established 11 field offices with a personnel of 18 commissioned officers, the headquarters at Washington, D. C., having a personnel of 4 commissioned officers. Under date of October 14, 1921, a reorganization of the general inspection service was effected, consolidating the 11 inspection areas into 4, as follows:

Atlantic general inspection area, comprising the first, second, third, and fourth general inspection areas; headquarters at New York, N. Y.
 Central general inspection area, comprising the sixth, seventh, and eighth general inspection areas; headquarters at Cincinnati, Ohio.
 Southern general inspection area, comprising the fifth and ninth general inspection areas; headquarters at New Orleans, La.
 Pacific general inspection area, comprising the tenth and eleventh general inspection areas; headquarters at San Francisco, Calif.

On the same date the commissioned personnel was reduced to 17 officers, including the staff at Washington, D. C.

Since October, 1921, there has been a steady decrease in commissioned and clerical personnel, both in the field and headquarters, until on May 1, 1922, at the time of the transfer of the hospitals to the United States Veterans' Bureau, the number of commissioned officers was reduced to 11, and on June 30, 1922, the number of officers was 6, including both headquarters and field.

The following table indicates the number of officers on duty during the various months of the year, the stations visited, and mileage traveled:

¹ Continental United States.

² Under date of October 5, 1921, orders were received to discontinue further inspections of contract hospitals. Such inspections to be undertaken after that date by the United States Veterans' Bureau.

Date.	Number of officers.	Stations visited.	Mileage.
1921.			
July.....	19	98	24,349
August.....	18	129	21,192
September.....	20	186	28,756
October.....	18	66	22,380
November.....	13	52	23,187
December.....	16	65	24,552
1922.			
January.....	10	64	18,815
February.....	10	56	18,245
March.....	9	45	16,731
April.....	8	35	17,727
May.....	7	13	4,709
June.....	8	12	6,918
Total.....	156	821	227,561

PURVEYING SERVICE.

The closing of the fiscal year 1922 shows that the work of the purveying service has greatly expanded over previous years due to the opening of many additional hospitals for the care of the constantly increasing numbers of beneficiaries. The total value of supplies distributed to various hospitals and supply depots was \$8,771,419. 89, of which \$2,522,584.39 was Army surplus stock, the same having been received through the several coordinating agencies of the Government.

In addition to the distribution of the above supplies and the maintenance and operation of two motor-vehicle repair shops, considerable progress has been made in restoring to serviceable condition great quantities of miscellaneous hospital equipment and numbers of motor vehicles.

CHIEF CLERK'S OFFICE.

FORCE ON DUTY IN BUREAU.

During the year the number of employees in the bureau decreased from 632 to 223. These reductions were principally due to transfers to the Veterans' Bureau of work connected with the treatment of veterans, although some decreases were effected by improvements in methods of work.

BUREAU OFFICE QUARTERS.

The amount of space occupied in temporary building C has been reduced to approximately one and one-third wings. In temporary building F 4,700 square feet are occupied as a dental clinic. The quarters occupied in the Butler Building and the grounds adjoining received careful attention and are in excellent condition.

PUBLIC HEALTH LIBRARY.

The library of the bureau now contains 9,241 volumes and approximately 3,500 pamphlets. During the year 41 books were acquired by purchase and 390 by gift and exchange. Medical, scientific, and health journals were currently received to the number of 108, of which 41 were paid subscriptions, and the remainder received gratuitously or through exchange. The library continued to develop its practice of cooperating with the other libraries of the city, particularly the Library of Congress and the library of the Surgeon General of the Army. There is great need of a comprehensive public-health library, but the present appropriation of \$500 for the purchase of books and journals is too small to permit rapid development.

EFFICIENCY RATING SYSTEM.

In accordance with the President's Executive order of October 24, 1921, the Public Health Bureau adopted, in common with the rest of the Department, the system of efficiency ratings devised by the Bureau of Efficiency. It is believed that substantial benefit will result.

GENERAL FILES SYSTEM.

Progress has been made in the planning of a general files system for the entire bureau and field service, which it is expected will promote both efficiency and economy.

STATIONERY SUPPLIES AND BLANK FORMS.

Throughout the fiscal year the storage and the shipment to the field stations of all stationery and blank forms and blank books was handled by the chief clerk's office. For this purpose, storage and shipping

rooms were maintained in building F. Practically no complaints were received from the field of delays in furnishing these supplies. However, on July 1, 1922, in accordance with order of the Secretary, this function, with the shipping plant and employees therein, was transferred to the newly organized Bureau of Supply of the Treasury Department.

TELEPHONE SYSTEM.

The switchboards in the Butler Building and C building were consolidated into a single improved switchboard located in the latter building. This change saved the salary of one operator and also materially improved the service.

RECOMMENDATIONS.

ADDITIONAL FACILITIES AT THE NATIONAL LEPROSARIUM.

Facilities are immediately required for at least 200 additional leper patients at the leprosy hospital at Carville, La. It is estimated that there are over 1,000 lepers in the United States. About 200 of these are being cared for at the above institution. Every available bed is taken and there is a waiting list of more than 100 applicants at the present time.

PERMANENT PROVISIONS FOR DENTAL SERVICES.

The importance of diseased teeth in causing or contributing to serious ailments is well recognized. In many cases medical treatment is inadequate unless supplemented by competent dental treatment. At the present time dental services are furnished beneficiaries by employing reserve commissioned dental personnel. The advisability and desirability of offering permanent commissions as an inducement to secure adequate dental services should in my judgment merit serious consideration.

REPAIR AND CONSTRUCTION OF MARINE HOSPITALS.

Hospitals maintained by the Federal Government, while not intended to be elaborate, should be substantial and maintained in accordance with reasonably high standards. It is impossible adequately to care for the sick in dilapidated buildings. Many of the marine hospitals are badly in need of repairs, and some of them should be reconstructed. Certain of these institutions have for years been the subject of much adverse criticism.

PERSONNEL LEGISLATION.

Former recommendations as to the necessity for legislation to increase the corps along the lines approved by the department in the past fiscal year are renewed. In this connection attention is invited to prospective increased activities as a matter of economy and efficiency in rendering medical examinations in compliance with the terms of the general retirement act for civil-service servants and in examinations to determine compensation in the case of injured employees. The importance of safeguarding such measures by competent medical officers is obvious.

INFORMATION OF DISEASE PREVALENCE.

In previous years estimates have been submitted to Congress for appropriations for the purpose of securing more complete information of the prevalence of diseases in the United States. A like estimate

was submitted this year, but for reasons of economy it has not been included in the estimate to Congress. The need is as urgent as formerly, and funds for this work should be provided.

PUBLICATIONS.

There is no way in which the Public Health Service can be of greater benefit to the public than by the publication and dissemination of information which will enable the individual to intelligently cooperate with health authorities. At present the service is limited in the exercise of this function to a degree inconsistent with economy and efficiency. Authority in law should be granted for larger editions of public-health publications.

NATIONAL QUARANTINE SERVICE.

The estimates for the maintenance of this service for the coming fiscal year are the minimum based on the operations of the year just concluded. No large vessel has been detained in quarantine during the year, but it must not be supposed that this gratifying situation can continue indefinitely. If it should become necessary to detain one or several large trans-Atlantic liners because of quarantinable disease this appropriation would soon be taxed far beyond its capacity and a deficit would certainly follow as an unavoidable consequence.

EXTENSION OF RESEARCH.

The most important function of a Federal health agency under our form of government is the investigation of diseases and matters pertaining to the public health. Even the discovery of abstract scientific facts may have a vital bearing on protective measures. Generous provisions should therefore be made for laboratory facilities and for the training of workers with which to carry on these researches.

FUTURE DEVELOPMENTS.

Experience has shown that the Federal Public Health Service as at present constituted is an efficient instrument for development in the carrying on of those health activities for which the National Government is responsible under the Constitution. Its development and adequate support, both in respect to facilities and personnel is therefore recommended.

H. S. CUMMING,
Surgeon General.

To the honorable A. W. MELLON,
Secretary of the Treasury.

APPENDIX.

FINANCIAL STATEMENT.

Receipts and expenditures, Public Health Service, for the fiscal year ending June 30, 1922.

APPROPRIATION: "PUBLIC HEALTH SERVICE, 1922."

Subheads of appropriations.	Appropriations and repayments.	Expenditures and encumbrances.	Budget saving.	Balance, June 30, 1922.
Pay, etc., commissioned officers and pharmacists (appropriation, \$1,020,000).....	\$1,020,473.99	\$1,017,738.20	.....	\$2,735.79
Pay of acting assistant surgeons (appropriation, \$300,000).....	302,492.15	300,000.00	.....	2,492.15
Pay of other employees (appropriation, \$840,000).....	847,461.40	840,000.00	.....	7,461.40
Freight, transportation, etc. (appropriation, \$55,000).....	59,783.06	57,000.00	.....	2,783.06
Fuel, light, and water (appropriation, \$135,000).....	135,000.00	116,505.84	\$13,500.00	4,994.16
Furniture, etc. (appropriation, \$8,000).....	8,000.00	3,950.21	800.00	3,249.79
Purveying depot supplies (appropriation, \$85,000).....	85,000.00	79,196.57	.....	5,803.43
Maintenance, Hygienic Laboratory (appropriation, \$50,000).....	50,000.00	44,970.42	5,000.00	29.58
Maintenance, marine hospitals (appropriation, \$625,000).....	1,181,281.43	1,065,293.17	.....	115,988.26
Care of seamen, etc. (appropriation, \$220,000).....	224,176.79	186,140.80	22,000.00	16,035.99
Books (appropriation, \$500).....	500.00	499.84	.....	.16
Disbursements as of June 30, 1922.....	.....	3,533,027.70	.....	.....
Encumbrances as of June 30, 1922.....	.....	178,267.35	.....	.....
Total (appropriation, \$3,338,500).....	3,914,168.82	3,711,295.05	41,300.00	202,873.77

APPROPRIATION: "QUARANTINE SERVICE, 1922."

Amount of appropriation.....	\$739,000.00
(Appropriation, \$350,000.00; deficiency, \$389,000.00.)	
Repayments.....	342,003.35
Total.....	1,081,003.35
Expenditures:	
Disbursements.....	\$437,203.48
Encumbrances.....	157,103.87
	594,307.35
Balance June 30, 1922.....	486,696.00

Expenditures by stations.

Name of station.	Pay and allowances officers and employees. ¹	Maintenance. ²	Total maintenance, pay, and allowances.
Baltimore, Md.....	\$24,419.96	\$12,285.58	\$36,705.54
Beaufort, S. C.....	520.86	518.30	1,039.16
Biscayne Bay, Fla.....	654.00	40.00	694.00
Boca Grande, Fla.....	1,235.00	560.24	1,795.24
Boston, Mass.....	47,011.70	23,225.50	70,237.20
Brownsville, Tex.....	6,259.98	644.86	6,904.84
Brunswick, Ga.....	4,440.00	3,466.30	7,906.30
Cape Charles, Va.....	44,604.78	49,944.70	94,549.48

¹ Paid from pay items, appropriation "Public Health Service, 1922."

² Encumbrances not included.

Expenditures by stations—Continued.

Name of station.	Pay and allowances officers and employees.	Maintenance.	Total maintenance, pay, and allowances.
Cape Fear, N. C.	\$7,195.50	\$3,906.16	\$11,101.66
Cedar Keys, Fla.	300.00		300.00
Charleston, S. C.	14,003.12	4,504.06	18,507.18
Columbia River, Oreg.	11,124.32	8,440.14	19,564.46
Cumberland Sound, Fla.	2,640.00	273.82	2,913.82
Delaware Bay and River	13,591.52	3,103.52	16,695.04
Delaware Breakwater, Del.	3,946.74	131.20	4,077.94
Eagle Pass, Tex.	11,284.00	1,269.42	12,553.42
El Paso, Tex.	30,388.08	2,712.76	33,100.84
Eureka, Calif.		15.00	15.00
Galveston, Tex.	26,833.48	9,440.32	36,273.80
Georgetown, S. C.	60.00		60.00
Gulf, Miss.	5,800.00	5,875.96	11,675.96
Honolulu, Hawaii	46,166.66	14,520.10	60,686.76
Hilo, Hawaii	(3)	(3)	(3)
Kalului, Hawaii	(3)	(3)	(3)
Key West, Fla.	8,709.42	602.66	9,312.08
Laredo, Tex.	14,163.48	16.52	14,180.00
Leprosy investigation station		390.66	390.66
Leprosy hospital, Hawaii	(4)	(4)	(4)
Mareus Hook, Pa.	29,425.00	7,165.98	36,590.98
Miscellaneous	12,449.26	562.68	13,011.94
Mobile, Ala.	11,742.16	8,127.88	19,870.04
New Orleans, La.	29,083.10	17,992.00	47,075.10
Pascagoula, Miss.	665.00		665.00
Pensacola, Fla.	9,838.00	5,365.94	15,203.94
Perth Amboy, N. J.	3,488.38	1,200.00	4,688.38
Port Arthur, Tex.	9,596.96	2,095.48	11,692.44
Port Aransas, Tex.	5,350.00		5,350.00
Port San Luis, Calif.	(5)	(5)	(5)
Portland, Me.	9,967.66	5,659.88	15,627.54
Port Angeles, Wash.		141.00	141.00
Port Townsend, Wash.	19,238.64	4,386.16	23,624.80
Providence, R. I.	9,723.18	7,404.26	17,127.44
Ponce, P. R.	3,340.00	84.00	3,424.00
Rosebank, N. Y.	238,058.82	144,640.68	382,699.50
Reedy Island, Del.	5,824.36	391.62	6,215.98
San Juan, P. R.	23,093.54	16,611.16	39,704.70
Sabine, Tex.	10,981.34	10,104.86	21,086.20
San Diego, Calif.	10,940.00	3,123.00	14,063.00
San Francisco, Calif.	49,190.34	38,105.32	87,295.66
San Pedro, Calif.	4,553.32	3,191.80	7,745.12
St. Andrews, Fla.	500.00	422.40	922.40
St. Georges Sound, Fla.	175.00	120.00	295.00
St. Josephs, Fla.	(6)	(6)	(6)
St. Johns River, Fla.	3,450.00	1,593.56	5,043.56
St. Thomas, Virgin Islands	12,833.34	1,320.68	14,154.02
Savannah, Ga.	11,899.66	6,624.00	18,523.66
Tampa Bay, Fla.	8,141.28	4,753.32	12,894.60
Philippine Islands, stations	4,912.00	116.00	5,028.00
Total	\$63,812.95	437,191.44	1,301,004.39

³ Included in Honolulu expenditures.⁴ Included in investigation station.⁵ Included in San Francisco expenditures.⁶ No expenditures.

APPROPRIATION: "PREVENTING THE SPREAD OF EPIDEMIC DISEASES, 1922."

Amount of appropriation	\$500,000.00
Repayments	56.70
Total	500,056.70
Expenditures:	
Disbursements	\$428,081.63
Encumbrances	19,918.91
	448,000.54
Total balance	52,056.16
Budget saving	50,000.00

Expenditures—Continued.

As follows—

Plague eradivative measures—

Louisiana.....	\$37,649.66
Texas.....	29,063.69
Florida.....	4,403.27
California.....	13,438.50
Washington.....	4,338.10
Miscellaneous.....	59,805.40

Prevention of trachoma—

Kentucky.....	56,653.24
Tennessee.....	8,769.26
North Dakota.....	8,332.87

Typhus fever prevention, Texas order.....

12,219.49

Preventive measures—

Baltimore, Ogdensburg, and miscellaneous stations.....	13,753.12
Cuba, South America, Mexico.....	23,318.48
France.....	23,086.76
England, Belgium, Holland, Sweden.....	28,624.77
Greece.....	2,528.20
Alaska, China, Canada.....	7,915.82
Italy, Spain.....	19,150.62
Rosebank, N. Y.....	9,494.40
Travel, telegrams, etc.....	4,923.18
Miscellaneous quarantine stations.....	36,390.19
Bureau hospitals, districts.....	18,112.07
Field investigation stations.....	4,220.75

Total.....	426,191.84
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APPROPRIATION: "FIELD INVESTIGATIONS OF PUBLIC HEALTH, 1922."

Amount of appropriation.....	\$300,000.00
Repayments.....	57.79

Total.....	300,057.79
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Expenditures:

Disbursements.....	\$271,553.61
Encumbrances.....	24,719.00
	<hr/> 296,272.61

Balance, June 30, 1922.....	3,785.18
Budget saving.....	2,500.00

APPROPRIATION: "INTERSTATE QUARANTINE SERVICE, 1922."

Amount of appropriation.....	\$25,000.00
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Expenditures:

Disbursements.....	\$19,200.71
Encumbrances.....	5,158.95
	<hr/> 24,359.66

Balance, June 30, 1922.....	640.34
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APPROPRIATION: "STUDIES OF RURAL SANITATION, PUBLIC HEALTH SERVICE
1922."

Amount of appropriation.....	\$50,000.00
Repayments.....	1.64

Total.....	50,001.64
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Expenditures:

Disbursements.....	\$49,086.60
Encumbrances.....	913.40
	<hr/> 50,000.00

Balance, June 30, 1922.....	1.64
-----------------------------	------

APPROPRIATION: "CONTROL OF BIOLOGIC PRODUCTS, PUBLIC HEALTH SERVICE,
1922."

Amount of appropriation.....		\$50,000.00
Expenditures:		
Disbursements.....	\$43,666.95	
Encumbrances.....	1,146.89	
	<hr/>	44,813.84
Balance, June 30, 1922.....		5,186.16
Budget saving.....		5,000.00

APPROPRIATION: "SALARIES, OFFICE OF THE SURGEON GENERAL, PUBLIC
HEALTH SERVICE, 1922."

Amount of appropriation.....	\$92,970.00
Expenditures.....	89,168.94
	<hr/>
Balance, June 30, 1922.....	3,801.06

APPROPRIATION: "PREPARATION AND TRANSPORTATION OF REMAINS OF
OFFICERS, PUBLIC HEALTH SERVICE, 1922."

Amount of appropriation.....	\$5,000.00
Expenditures.....	1,147.26
	<hr/>
Balance, June 30, 1922.....	3,852.74

APPROPRIATION: "MEDICAL AND HOSPITAL SERVICES, PUBLIC HEALTH SERVICE
1922."

Amount of appropriation.....	\$25,891,882.67
Repayments.....	989,974.01
	<hr/>
Total.....	26,881,856.68
Expenditures:	
Disbursements.....	\$24,503,628.49
Incumbrances.....	2,111,724.03
	<hr/>
	26,615,352.52
Balance, June 30, 1922.....	266,504.16

APPROPRIATION: "PAY OF PERSONNEL AND MAINTENANCE OF HOSPITALS, PUBLIC
HEALTH SERVICE, 1922."

Amount of appropriation.....	\$4,080,000.00
Repayments.....	840,865.85
	<hr/>
Total.....	4,920,865.85
Expenditures:	
Disbursements.....	\$4,209,878.39
Incumbrances.....	401,312.26
	<hr/>
	4,611,190.65
Balance, June 30, 1922.....	309,675.20
Budget saving.....	200,000.00

APPROPRIATION: "EXPENSES DIVISION OF VENEREAL DISEASES, PUBLIC HEALTH
SERVICE, 1922."

Amount of appropriation.....	\$200,000.00
Repayments.....	2,098.93
	<hr/>
Total.....	202,098.93
Expenditures:	
Disbursements.....	\$173,324.56
Incumbrances.....	8,108.88
	<hr/>
	181,343.44
Balance, June 30, 1922.....	20,755.49
Budget saving.....	14,590.40

APPROPRIATION: "HOSPITAL CONSTRUCTION, PUBLIC HEALTH SERVICE."

Balance, July 1, 1921.....	\$694, 272. 03
Expenditures.....	523, 597. 45
Balance, June 30, 1922.....	170, 674. 58

APPROPRIATION: "HOSPITAL FURNITURE, PUBLIC HEALTH SERVICE."

Balance, July 1, 1921.....	\$115, 487. 46
Expenditures.....	114, 175. 96
Balance, June 30, 1922.....	1, 311. 50

APPROPRIATION: "INCREASE OF COMPENSATION, TREASURY DEPARTMENT, 1922."

Total payments, Public Health Service, June 30, 1922.....	\$2, 526, 512. 16
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MISCELLANEOUS APPROPRIATIONS.

LEPROSY HOSPITAL, HAWAII.

Balance, June 30, 1922.....	\$16, 956. 35
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MARINE HOSPITALS.

Baltimore, Md. (act Mar. 28, 1918):	
Balance, June 30, 1922.....	15, 767. 41
Boston, Mass. (act Mar. 28, 1918):	
Balance, June 30, 1922.....	6, 809. 26
New Orleans, La. (act Mar. 28, 1918):	
Balance, June 30, 1922.....	960. 07
New York, N. Y. (act Mar. 28, 1918):	
Balance, June 30, 1921.....	\$18, 458. 84
Expenditures.....	2, 540. 40
Balance, June 30, 1922.....	15, 918. 44
San Francisco, Calif. (act Mar. 28, 1918):	
Balance, June 30, 1922.....	892. 02
Savannah, Ga. (act Mar. 28, 1918):	
Balance, June 30, 1922.....	5, 932. 14

(Balances, June 30, 1922.)

Cleveland, Ohio (act Mar. 4, 1909).....	100. 00
Cleveland, Ohio (act Mar. 4, 1907).....	374. 95
Cleveland, Ohio (act July 26, 1916).....	1, 000. 00

QUARANTINE STATIONS.

Boston, Mass. (act Oct. 6, 1917):	
Balance, July 1, 1921.....	\$10, 673. 35
Expenditures.....	987. 63
Balance, June 30, 1922.....	9, 685. 72
Cape Charles (act Oct. 6, 1917):	
Balance, June 30, 1922.....	5, 689. 98
Gulf (act June 12, 1917):	
Balance, June 30, 1922.....	8, 000. 00
Key West, Fla. (act June 12, 1917):	
Balance, June 30, 1921.....	7, 000. 00
Reedy Island (act Nov. 4, 1918):	
Balance, June 30, 1922.....	33, 001. 64

(Balances, June 30, 1922.)

Brunswick (act June 25, 1910).....	1, 708. 87
Charleston (act Mar. 4, 1909).....	634. 46
Columbia River (act June 25, 1910).....	745. 47
Columbia River (act June 12, 1917).....	350. 90
Columbia River (act July 1, 1916).....	4, 201. 19

Delaware Breakwater (act Mar. 4, 1907).....	\$857. 00
Gulf (act Mar. 4, 1907).....	353. 35
Honolulu (act Sept. 8, 1916).....	10, 000. 00
Honolulu (act Mar. 4, 1907).....	390. 52
Mobile (act July 1, 1916).....	10, 000. 00
New Orleans (act July 1, 1916).....	11, 150. 90
Pensacola (act Mar. 4, 1917).....	18. 02
Reedy Island (act Mar. 4, 1909).....	66. 71
San Francisco (act Mar. 27, 1908).....	1, 511. 71
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Savannah (act Mar. 4, 1909).....	410. 85

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